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Desired and Actual Fertility in Bangladesh:
The Role of Mass Media and Social interactions

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Contents

List of Tables

List of Figures

List of Acronyms

AIDS   Acquired Immunodeficiency Syndrome
AF   Actual Fertility
BD   Bangladesh
BDHS   Bangladesh Demographic and Health Survey
CIA   Central Intelligence Agency
CMR   Child Mortality Rate
CPR   Contraceptive Prevalence Rate
DF   Desired Fertility
DV   Domestic Violence
FP   Family Planning
FWA   Family Welfare Assistant
GOB   Government of Bangladesh
HH   Household
IMR   Infant Mortality Rate
IV   Instrumental Variable
MR   Menstruation Regulation
NIPORT   National Institute of Population Research and Training
OLS   Ordinary Least Square
RHR   Reproductive Health and Right
RSHR   Reproductive and Sexual Health and Right
STD   Sexually Transmitted Disease
TFR   Total Fertility Rate
TPB   Theory of Planned Behaviour
2SLS   Two Stage Least Square
TV   Television
UN   United Nations
UNFPA   United Nations Population Fund
WE   Women Empowerment

Acknowledgements

Abstract

The roles of mass media and social interactions on fertility transition are widely recognized for both ideational and behavioural effects; however, few efforts have been made to study the effects of both together so far. This study in investigating the determinants of fertility among ever married women of age 15-49 years in Bangladesh has made this effort empirically by using cross-section survey and qualitative data. The results show that social norm is the significant predictor of desired fertility; and the positive effect to higher order desires suggesting in Bangladesh still now on average society approves more than two children as ideal family size; however, access to mass media and social interactions increase individual's probability of choosing small family as ideal. The study also unearths that individual who has higher desired number of children has higher number of actual births; and women empowerment contributes an important role in fertility decisions and implementations. Furthermore, the study finds variant effects of mass media, social interactions and social norms across socioeconomic groups regarding fertility. The findings of the research can be attributed to the successful interventions for shaping popular fertility ideals; consequently, fertility behaviour of the individual.

Relevance to Development Studies

Contribution of fertility in population dynamics always considered as important issue where expected intervention is required from policy perspective or development research. To devise appropriate development interventions underlying factors need to be explored. Previous studies have demonstrated the potential effects of either mass media or social interactions separately as determinants of desired and actual fertility more generally. Little is known about the effects of both from a single study. Hence, identifying the impacts of mass media and social interactions on fertility facilitates to devise policy and programmes for FP interventions in many settings.

Keywords

Desired and actual fertility, Social interactions, Social effects, Social norms, Women empowerment, Bangladesh

Chapter 1   Introduction

Recognition of the effects of mass media and social interactions,[1] either in individual level or in social level, on human behaviour initiates research in population studies in different settings; and documents evidences that well-designed information, education, and communication (IEC) interventions through media and social interactions increase knowledge, influence choices, and change norms and behaviour of individual as well as group as a whole. In the domain of planned family model, mass media and other community level motivation strategies have been devised in many high fertility regions of the world to adjust individual's fertility ideals and behaviour with changing or new fertility ideals and outcomes of the society. Learning and implementing the fertility ideals of a given society is a complex and multidimensional process of integrating diverse information from multiple sources and numerous forms which results in changes of preferences and behaviour. These changes consist of stages of knowledge, approval, intention, practice, and advocacy (Piotrow et al. 1989); and mass media campaigns have effects at these stages. Influence of media or media content on fertility regime of the individual takes place within the mechanisms of social learning process-- the process of sharing and processing of own information to comply with the social norms through interactions with social partners, i.e. spouse, neighbours, kin, peers, and reference groups within household, community or social levels.

Substantial impact of social norms in fertility regime is illustrated in a way that as a member of the society individual's fertility desires determine, shape, and change through social effects; and which results in fertility outcomes. In this process, individual's fertility desire match with the fertility desires of the society in stable settings since individual knows the eventual social norms associated with fertility in her community. One could assume that if society needs to reshape the fertility norms information about it needs to be transferred either through media communication or social interactions, for instance, media intervention or home visits by Family Welfare Assistant (FWA) within the community may transmit the new emerging fertility choices of the community (Munshi and Myaux 2006); and help the convergence of individuals' ideals across the community by influencing their preferences.

Existing mainstream demographic theories on changes in fertility behaviour in most cases ignore the role of fertility choices and choice implementation; hence, overlook the underlying factors determining the preferences. A dominant view in economics of fertility, whether quantity-quality trade-off or demand-supply, is that in the settings of lack of motivation or economic preference drawbacks of fertility regulation fertility preferences

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[1] Meaning of the term to some extent synonymous with other author's concept of interpersonal interactions/communication (e.g. Coleman 1993, Montgomery and Casterline 1996).

may play no role in explaining fertility[2]. However, recently in explaining fertility transition growing number of studies are focusing on the gap between intended or desired fertility (DF) and implemented or actual fertility (AF); and advocate that desired fertility is one of the key factors affecting fertility gap (e.g. Bongaarts 2001, Pritchett 1994). For developed countries with a very low fertility, the gap is mostly positive (DF-AF) or the actual child bearing is lower than the desired fertility; whereas, for high fertility developing countries, in most cases the gap is negative which implies that actual child bearing is higher than the desired fertility[3]. Instead of the dominance of two-child or one-child family size discourse, in developing countries, the intended and implemented family size is much higher. For instance, in Bangladesh the mean ideal family size of 2.3 children is lower than actual Total Fertility Rate (TFR) 2.7. Indeed, it explains the unmet need and need of family planning (FP) intervention and supports the insignificant role of fertility desires on fertility behaviour. However, in the context of FP intervention and universal knowledge on contraception, the unmet need theory would not be enough to explain the gap between desired and actual fertility in most cases; and desired fertility view can contribute significantly in explaining the gap. As a result, how this desires or preferences form and change is important to the population scientists to know the dynamic of population growth because though we assume that contraceptive intervention and availability is important for preference implementation or actual fertility; preferences or desired fertility and actual fertility both may be influenced by media and social partners by exchanging information and views on social ideals of fertility regime.

Giving the importance to the impact of mass media and communication interventions, the increasing focus of fertility studies are on access and contents of mass media campaigns and strategies; and find considerable effects of media on individual's reproductive behaviour. On the basis of research, it is thought that media campaign is enough to change the fertility norms and choices and many governments in developing countries stopped domiciliary services[4] through the health workers to make the FP program cost-effective. In most cases, fertility rate remain stable or increased; for instance, in Bangladesh, after withdrawal of domiciliary services in 1998, the TFR and Average Ideal Number of Children (AINC) remained same for the period of 1997 to 2004 (even increased in 2000)[5]. Social learning and influence model supports that mere media exposure is not enough in shaping fertility preferences of the individuals; and hence behaviour. In Bangladesh, though every woman does not have media access[6], almost all ever married and currently married women know at least one modern method of family planning, but Contraceptive

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[2] for instance see 'endogenous preferences and births production function' model of Easterlin et al. (1980)

[3] Since natural fertility may be greater than, equal to or less than desired fertility (see Easterlin et al. 1980).

[4] One type of social interactions.

[5] See Table 1.1. Domiciliary service resumed in 2004.

[6] 63.58% has any type of media exposure from radio, TV or newspaper in the present data set. According to recent media survey 70% of the population across the country has TV access (source: http://www.thedailystar.net/forum/2010/june/TV.htm).

Prevalence Rate (CPR) is only 56%; and almost three in five contraceptive users in Bangladesh stop using their methods within 12 months of starting (NIPORT 2009). From this, it seems, in desired and actual fertility, there are other contributing factors. Here, according to the assumption of social effect mechanisms, lack of social interactions media exposure has little effects on fertility desires and desire implementations. This study analyzes how fertility desire shape and to what extent people have been able to implement their desired fertility and how this associates to social interactions and media exposure. In this paper, our aim is to offer a model that individual's desired fertility is driven by underlying social norms and is the significant determinant of actual fertility. Media and social interactions shape social norms and inform individual about the norms which prompt her to set own desires and behave accordingly. We use Rossier and Bernardi's (2009) Theory of Planned Behaviour (TPB) approach within social network mechanisms for our broader theoretical framework of fertility assuming that behaviour depends on intentions. In modelling our desired fertility, we take Pollak's (1976) interdependent preference model on consumption; and the assumption is that preferences of individual depend on other people's preferences.

1.1 Problem Statement

Instead of a significant decline in fertility, world population is projected to be 7 billion on 31 October 2011 and reach to 9.3 billion by the middle of the 21st century (UNFPA 2010). Lutz et al. (2004) in their book pronounce that world population is decreasing; and in fact, the demographic trends are now towards below replacement level irrespective of developments, and in practice, population is growing for the contribution of hidden population momentum. Therefore, Malthusian perspective in the debate on economic implications of high population growth has lost its proper appeal to some extent. Nonetheless, the pessimistic view, to those increased population, in general, is an impediment to the economic growth, focuses on the diminishing savings or capital formation, decreasing per capita output of labour or surplus of labour supply, reducing investment in human capital formation and recently environmental degradation (e.g. Coale and Hoover 1958, Domar 1946, Harrod 1939, Solow 1956). Giving credit to human innovation, the optimistic view assumes that though high population growth has adverse effects, technological advancement and application in agricultural and industrial diversifications increase productivity which is beneficial to development (Gould 2009). The progressive ideas on the intrinsic worth to high fertility illustrated, for instance, by Boserup (1965), the positive role of growing population in agricultural intensification and increased productivity; by Simon (1981), the benefits of enhanced infrastructure and services due to high density of population (stated in Gould 2009); and by Kuznets (1960) the growth efficiency initiated and maintained by large number of geniuses[7] whose number increases due to large

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[7] in Bangladesh who supports large family, some time cites example of Tagore who is the lone Noble Laureate in Bengali Literature and was the youngest of the thirteen survival children to his parents.

population. In addition, advocates of the role of good policies consider the contribution of population growth as less important factor in facilitating or hindering economic growth or development (Das Gupta et al. 2011).

Economic growth initiated by technology certainly increased production; and possibly, limits Malthusian endemic poverty trap; nevertheless, in the growth process, we cannot deny the classical economists' understandings of the problem of declining marginal returns to some extents (Wrigley 1987). To meet the growing food demands for increasing population, intense technology and productivity degrades ecology and environment by depleting important resources; and in addition, by replacing human labour modern technology perpetuate food insecurity; after all, technology has limits (Gould 2009). Moreover, empirical evidence from various settings support that low fertility is associated with well beings by increased investment in human capitals, women labour force participation, household earnings, savings and assets (Joshi and Schultz 2007). The Malthusian view on the constraints of high fertility in economic growth is still relevant in poor nations (Das Gupta et al. 2011); and hence, theorists still attempt to identify the dynamics of population growth.

Indeed, fertility has declined throughout the world over the years; but wide variations and delays in trends and changes in the fertility regime have also been frequently observed, both across countries as well as within countries (Munshi and Myaux 2006). The causes of these trends, however, are the issue of debate. Theories of fertility have prompted diverse explanation and focused on a range of factors of childbearing decisions of households, e.g. high mortality (Notestein 1953), quality-quantity trade-off, opportunity costs of child bearing (Becker 1960, 1991), institutional contexts (Smith 1989), familial relationships (Mason 1997, 2001), changes in technology, ideas and norms, institutions (economic and social), individual autonomy, women's labour-force participation and position in household decision-making (Crook 1997, Montgomery and Casterline 1997, Lesthaeghe and Surkyn 1988), social interactions (Bongaarts and Watkins 1996), development or human capital investments (Grimm 2003) and so on.

In these mass of views, studies on explanatory strength of desired fertility and which factors contribute to shape the fertility ideals have turned into a complicated area. Regarding fertility choices and decisions of individual and group, media and social interactions are considered as important in providing perfect information, and counselling among the social partners about reproductive behaviour. Historically, with a very high TFR, Bangladesh takes media as a key component of FP program in fertility regulation attempting to encourage FP methods among couples. But research findings suggest that FP program has very little to do in fertility reduction, even voluntary (Grimm 2003); desired fertility is the explaining factor of implemented family size (Pritchett 1994). However, according to Das Gupta et al. (2011) FP program is active to actual fertility by playing role in reducing desired fertility. Indeed, in the framework of social effects on reproductive regime, content of mass media and social interactions influence desired and actual fertility through their influence on social norms. We intend to illustrate the link of mass media and

social interactions in shaping social norms and individual's fertility preferences; and indirect effects of FP knowledge and use.

Understandings of Bangladesh circumstance offer a unique opportunity to scrutinize the social effect mechanisms for some reasons. Since early 1970s Bangladesh has a strong FP program; and gives emphasis on the acceptance of FP among couples. Initially, Bangladesh FP program has promoted the ideas such as 'boys or girls, two child is enough'; and now moving towards one-child family norms by advocating 'not more than two, one is better' (GOB 2004). However, the fertility decline rate during the past three decades was very quick, but after that the pace is very slow. From the beginning, FP interventions in Bangladesh employ both media messages and motivational programs, i.e. domiciliary services to publicize the fertility norms or ideals and planned family behaviour. In Bangladesh, though there is an assumption that effective FP programs largely contributed in fertility decline, there is no conclusive evidence whether the FP program also brought down the popular fertility ideals; and most crucial is though knowledge about contraceptives is almost universal, acceptance rate is not much higher and Bangladesh could not yet achieve replacement level fertility.

1.2   Background and Settings

According to Bangladesh Planning Commission's projection if Bangladesh achieved replacement level fertility by 2010, the population would be stabilized at 210 million by 2060 (GOB 1995), which has not attained so far. Bangladesh is the 7th most populated country in the world (about 156 million), with a growth rate of 1.55 percent and TFR 2.65 (CIA 2010). Though TFR in Bangladesh is not much higher like other developing countries, it is already overpopulated within a small territory of 147,570 square kilometres with per capita cultivated land of only 12.5 decimals which is decreasing day-by-day (Quasem 2011). Instead of naturally arable land, domestic production is insufficient to meet the basic consumption needs of the population and national economic growth is vulnerable to increased trade deficits. Moreover, internal migration generates competition for land, creates job scarcity, increases urban poverty and slum dwellings, and deteriorates overall living standards.

Since independence in 1971, all subsequent governments, considering population growth as national problem, assert FP program to reduce TFR. Bangladesh Population Policy sets objectives to achieve replacement level fertility and to increase the use of contraceptives by raising awareness among couples. In fertility decline, Bangladesh has achieved a very impressive progress over the years, e.g. during the 1970s to 1980s period fertility declined from 6.3 to 4.3 and 1990s to 2010s it reaches 3.4 to 2.7 (Table 1.1).

Table 1.1
Trends of Fertility Regime in Bangladesh

Year	1975	1989	1991	1994	1997	2000	2004	2007
CPR [a]	7.7%	30.8%	39.9%	44.6%	49.2%	53.8%	58.1%	55.8%
TFR [b]	6.3	5.1	4.3	3.4	3.3	3.3	3.0	2.7
AINC [c]				2.49	2.47	2.51	2.4	2.3
Up to God [d]				10.11%	5.85%	3.0%	3.73%	2.17%

Notes: [a] Contraceptive prevalence rate, [b] Total fertility rate, [c] Average ideal number of children (excluding qualitative responses), [d] including nonnumeric responses to the ideal number of children. Source: NIPORT 2009 and BDHS datasets.

However, there is a great difference among various socioeconomic groups; for instance, differentials in TFR in terms of residence (urban-2.4; rural-2.8), education (educated-2.3; non-educated-3.0), wealth quintiles (rich-2.2; poor-3.2), religion (Hindus-2.5; Muslim-2.9) and regions (Khulna-2.0; Sylhet-3.7) as well (NIPORT 2009). These variations may be partly due to differentials in exposure and interactions within specific culture, social settings, individual motivations and preferences.

In Bangladesh universal marriage and childbearing is established social norms; and early marriage ensuing teenage pregnancy is very common even to this day which contributes to the fertility ideals and behaviour as a whole. Munshi and Myaux (2006) found variant attitude to reproductive behaviour among different socioeconomic groups and crucial role of social norms regarding fertility regime in Bangladesh. They observed an important role of religious group to which individual belongs and a clear divergent of two major religions in fertility regulation.

Figure 1.1
Trends of Actual and Ideal [a] Number of Children across Religion
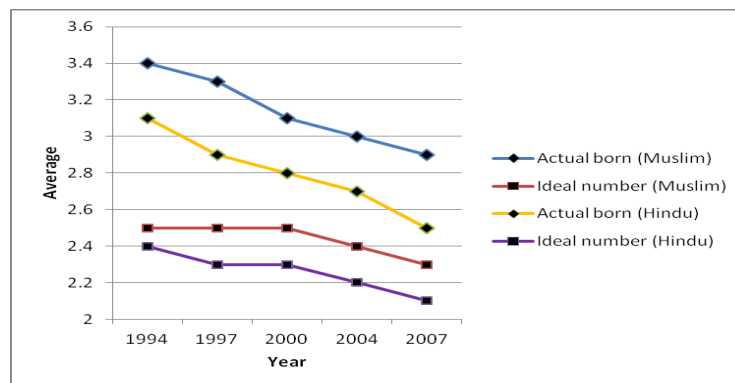
Note: [a] Nonnumeric responses dropped from ideal number estimation.
Source: Based on BDHS datasets.

In Figure 1.1, we see the differences in actual born and ideal number of children among the two major religions; and in addition, 96.93% of whatever God gives and nonnumeric responses are given by Muslim women, whereas 3.07% responses are by Hindu women in 2007 BDHS. Education, place of

residence even region play important role in influencing fertility ideals and behaviour. In Sylhet, an rural middle class Muslim woman having seven years of schooling (mother of four children) expresses her fertility ideals by showing clear dissatisfaction on deliberate fertility regulation:

> 'You people talk about contraception, fertility regulation; can you have a child through your own efforts if God does not wish to give you?'

Within gendered culture women's life perspectives broadly depend on the given opportunities surrounded her. Traditionally, in Bangladesh, gendered physical mobility limits women's contact with outside worlds; women who do not work outside home, have very little physical mobility, basically her contact is limited within few neighbouring homesteads (Munshi and Myaux 2006). Though at present overall women labour force participation has increased a bit,[8] that does not change women's position much due to established gender roles in the society. Though uprising telecommunication services open women's contact opportunities to outside in most regions, this depends on women's social position, education and earning capacity. This geographic delimited social interactions of women prompted us to observe the social network effects on the basis of spatial proximity, and that is cluster[9]; and the assumption is media exposure may affect preferences of the individual but lack of social interactions it has little effects on the FP utilization; and our analytical presumption is that cluster level media and FP exposure shape social norms of fertility which affects individual's desired number of children that ultimately turn into actual births which we will observe in our analysis section 5.

In addition, media exposure and social interactions vary by gender, education, residence, region and wealth quintiles. Men are more likely to be exposed to each type of mass media than women. Avogo (2008) shows that men's social networks have a significant impact on couple's joint fertility intentions both directly and indirectly; while that of women only affects indirectly. In Bangladesh, patriarchal embargo and social pressure in women's decision making, and mostly male dominating media access and social interactions leave very little room for women to have own fertility desires. Instead of these, the FP program in Bangladesh, like elsewhere, has predominantly viewed women as main actor in fertility regulation on the ground of empowering women. As a result, in Bangladesh the responsibility of fertility regulation is mostly on women. However, low female empowerment at the end results in low decision making power of women including decisions regarding desired and actual fertility.

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[8] According to 2008 UN estimation 57.4% of adult women participate in labor force (http://data.un.org/CountryProfile.aspx?crName=Bangladesh).
[9] Cluster is a geographic distribution of households, which is the primary sampling unit of 2007 BDHS (details in NIPORT 2009).

1.3   Research Objectives and Questions

This study aims to investigate the underlying socio-cultural factors that influence desired fertility and the gap between desired and actual fertility in a developing country with an intermediate TFR and wide contraception knowledge and interventions. In particular, the paper examines the determinants of fertility of women in Bangladesh; and assumes that desired fertility affects actual fertility; and mass media and social interactions contribute to shaping fertility ideals by contributing to shaping the social norms regarding fertility. Starting with a general research question of what is the role of mass media and social interactions in forming desired and actual fertility in Bangladesh, the specific questions come as follows:

- How does exposure to media and community level social interactions shape fertility preferences and preference implementations among women in Bangladesh?

- Are mass media and social interactions complementary or are they in conflict regarding to fertility decisions?

- How does the effect of mass media on fertility decisions differ across different socioeconomic groups?

- How important is women's decision making power in this context for preference implementations?

1.4   Justification and Relevance

In this paper, our aim is to offer a model that individual's desired and actual fertility are driven by underlying social norms; and in this process mass media and social interactions play important roles. We test these implications of the model with a BDHS data set which includes information on fertility behaviour, FP exposures as well as demographic and socio-economic characteristics for nationally representative number of women residing in 361 clusters. We present empirical results in chapter 5 and see the significant social effects on individual's fertility regime. We also show that individual's fertility behaviour is greatly associated with desired fertility, even after controlling the FP exposures which also, of course, implies that FP is explaining some of the variance in desired fertility; however, given that desired fertility is still significant the other things in desired fertility are not related to FP.

We expect that this survey will contribute to existing literature of fertility studies and media and social interactions in many ways. To our knowledge, this is the first study on the explanatory role of desired fertility on actual fertility in Bangladesh so far. Studies on mass media and social interactions in explaining fertility norms and behaviour in Bangladesh is very limited. Overall, in fertility studies, research on both mass media and social interactions altogether, to our knowledge, has not been attempted much. Finally, it links to the debate on explanatory strength of fertility ideals on actual fertility.

1.5   Limitation of the Study

Both mass media and social interactions in explaining fertility hardly exist in a single study. Available data on both dimensions in a specific dataset is very limited. Bernardi et al. (2007) mention that though social interaction is considered as vital in shaping fertility preferences, study on social interactions and fertility behaviour is not sufficient due to problems encountered in collecting appropriate empirical evidence. Moreover, by using cross section data it is difficult to say anything about causal relationship among the variables or dynamic of relationships over the time. In cross-section analysis, there is a risk to pick up spurious correlation, so we are not assuming that all relationships are causal here. In empirical analysis, one may attempt to estimate desired and actual fertility simultaneously.

1.6   Organization of the Paper

The rest of the paper is organized as follows. In chapter 2, we discuss theoretical and analytical framework, including empirical literature. Chapter 3 presents the methodology and data that used in this research; and provides descriptive statistics on key variables. In chapter 4, models and estimation procedures are presented. We present results and findings in chapter 5. Finally, chapter 6 concludes with a discussion.

Chapter 2   Theoretical Framework and Analytical Approach

2.1   A Review of the Literature

The first strand of related literature of this research is the debate on contributing factors to fertility which we discussed in previous section; we also mentioned the distinctiveness of the present paper is that we assume social desires as primary contributing factor to individual's fertility desires; and individual's fertility desires to her actual births. The second strand of literature related to this paper, we discuss here, is the effects of mass media and social interactions and the mechanisms of the effect on individual's fertility regime. In explaining reproductive regime, studies mostly footed to diffusion of information mechanisms where importance of both media and social interactions is evident. Through the mechanisms of social influence, learning, and support social effects active on individuals' fertility ideals and behaviour (Rossier and Bernardi 2009). Individual gradually learns about the new reproductive equilibrium that emerges in her community through social interactions with other members of the same community (Munshi and Myaux 2006).

Mass media messages affect individual's behaviour indirectly by encouraging social interactions; and even, directly by representing new norms through new role models. Rogers et al. (1999) in a study in fertility transition in Tanzania found that radio soap opera has strong behavioural effects on fertility regime; it increases listeners to discuss within their social networks about contraception. They uncovered that married women who listens the radio soap opera and talk with spouse are more likely adopt FP, but their findings could not revealed the significant effect of soap opera in declining fertility ideals. However, in a study on education-entertainment radio soap opera in St. Lucia using data from 1996 to 1998 Vaughan et al. (2000) showed, whereas listeners' ideal family size was 2.3; non-listeners' was 2.9.

Chong and La Ferrara (2009) revealed how media exposure directly affects viewer's behaviour by changing traditional norms through new role models. In their study on the link between television and divorce in Brazil over the period of 1970-1991 evidenced that number of divorced or separated women increases after the increased television coverage. By using data on five Indian states for the period 2003-2008, Jensen and Oster (2008) confirmed large and rapid effects of cable television on female autonomy and on decline in desired number of children. Ferrara et al. (2008) studied on the effects of television on individual's preferences towards fewer births in Brazil and observed that without deliberate state intervention fertility decline significantly. They also found the variant effects of soap opera across socioeconomic groups, i.e. stronger effects for women of low socioeconomic status, in the middle and late phase of childbearing. Islam and Hasan (2000) by using BDHS dataset of

1993-94 revealed that mass media, especially radio, has a significant effect on contraceptive use in Bangladesh.

Laying down these empirical literatures, we can presume that the mass media effects, whether direct or indirect, are organized within the social effect mechanisms that occurred through the social interactions either in individual network or social network. In explaining norm-based fertility transition in rural Bangladesh, Munshi and Myaux (2006) found that local changes in reproductive behaviour occur within religious groups; and assumed that social interactions among the women cannot be substituted with other interventions. Entwisle et al. (1996) and Rogers and Kincaid (1981) showed homogeneity of choices in village in the contraceptive preferences. It must be result of the diffusion of contraceptive information through interpersonal networks (Rogers et al. 1999). Since individuals locate within the social networks, their childbearing attitudes, preferences, decisions, and behaviour may arise from the social learning and influence with the interactions of kin, relatives, peers (Bernardi et al. 2007).

However, media exposure may reduce social interactions among social partners due to time allocation for both events; and partly offsets the social learning effects. In a study on the impact of television and radio on participation in social groups in Indonesian villages, Olken (2009) observed that increased access to television reduces the participation in social groups. Television watching (privately or community level watching) affects social interactions (Jensen and Oster 2009). At one side, media plays important role in fertility decline; on the other side, reduces social interactions, which challenges the assumption of diffusion of knowledge across the socioeconomic groups. Conversely, though from other evidence we can conclude the importance of social interactions in influencing fertility regime, is social interaction really so important? For instance, if we consider physical mobility as one of the important means of social interactions, then highly mobile poor women (labour force participation is higher than other social groups[10]) in Bangladesh has the highest TFR and AINC.

In fact, in explaining variations in the effects of mass media or social interactions on reproductive regime, studies focus on the differences in life chances. Dommaraju and Agadjanian (2009) showed that spatial or socioeconomic variations in desired and actual fertility can be explained by differences in fertility regulations where gender and economic factors are pertinent; however, which does not imply the rationale of unmet need or limited knowledge of FP. In many settings, observed fertility declines mostly independent to women empowerment and autonomy (e.g. Amin and Lloyd 2002, Bhattacharya 2006, Dommaraju and Agadjanian 2009). Dommaraju and Agadjanian (2009) explained that changes in fertility regime in Bangladesh in most cases are not due to changes in women's status, but due to changes in the reproductive behaviour of illiterate women. But in a study exploring the role of fertility preference implementation on the onset of fertility transition in Nigeria, Ibisomi (2007) found superiority of husbands in fertility decision-

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[10] Among our working respondents, 43.97% is of poor class.

making in households among couples, but not in actual fertility outcomes. Allowing the issue of women empowerment on both desired and actual fertility helps to illuminate whether fertility differentials are due to variant ability or willingness of women to fertility regulations.

Though studies on the effects of mass media and social interactions on diverse issues of reproductive regime are not new, an interactive effect of both is rarely studied. Since most of the studies examined the effects of media and social interactions separately, we cannot conclude about their complementary or contradictory role in fertility regime. However, from Avogo's (2008) efforts in examining the sources and impacts of formal and informal social diffusion mechanisms on fertility regime in southern Ghana, we learn the significant impacts of media on fertility desires, and of exchanged information on fertility attitude and behaviour within personal social networks. Indeed, most of the studies overlook the mechanisms of mass media and social interactions effects; hence, ignore the role of social norms on individual's reproductive regime, however, this survey sheds light particularly for developing countries. In addition, it empirically focuses on the origin and effects of the social norms on individual's fertility ideals, which has not been yet addressed so far. Moreover, apart from previous studies, this survey investigates the interactive effects of mass media and social interactions and socioeconomic groups on fertility regime.

2.2 Theoretical Framework

In section 1, we mentioned planned family regime initiated the emergence of diverse theories and models on determinants of fertility; and microeconomic analysis of fertility is the prominent among these which assumes that demand for, and supply of children, and fertility regulation costs are the determinants of fertility; and demand for children depends on balancing between the tastes for all other goods and children for a given prices and income (see Easterlin 1975). Variations and changes in fertility preferences or demand for children can be explained by the variations or changes in prices, income, and tastes. So holding other things constant, demand-supply theory assumes that fertility preferences will change if prices, income, and tastes of individual changes; indeed, implies that if prices, income, and tastes are constant fertility preferences would be constant. However, assuming a situation where prices, income, and tastes of the other goods are constant what changes the preferences of the individual for children and how the tastes for children origin and shape effectively offer the scope for socio-cultural explanations.

Since, this study intends to model individual's desired and actual fertility; and overall assumption is that media exposure and social interactions affect individual's behaviour mainly because of changes in norms and attitudes related to fertility behaviour of the group, and individual consecutively; we adopt, in general, the theory of planned behaviour of social psychology within social network mechanisms which integrates fertility desires as an important determinant of actual fertility, and within this framework in modelling desired fertility we use interdependent preference model of economics which

integrates social norms as an significant predictor of fertility desires. Figure 2.a presents the theoretical framework of this research.

2.2.1 Theory of Planned Behaviour: desired and actual fertility

Theory of planned behaviour (TPB) developed by Ajzen (1991) has been used in many behavioural studies and settings and predominantly in most of the recent studies in high-level CPR and low TFR countries of Europe (e.g. Bernardi et al. 2007, Billari et al. 2009, Liefbroer and Gierveld 1993, Philipov 2009, Philipov and Testa 2007, Schoen et al. 1999). According to TPB, the occurrence of a specific behaviour can be predicted by individuals' intentions to behave in that way and their ability to do so, given their skills and resources. On the other hand, individual's intentions are shaped by perceived behavioural control, attitude toward the behaviour, and subjective norms or social pressure. This model through the subjective norms takes social interactions effects partially into account (Rossier and Bernardi 2009).

Rossier and Bernardi (2009) integrate the social network mechanisms into the TPB approach. According to them three main social network mechanisms by which social interactions between individuals and their network partners can have impacts on individual's behaviour are: social learning-- processes of acquisition of new information through informal interaction with others; social influence-- mechanisms of reference group effect, contagion, and social pressure; and social support-- informal exchange of goods and services which can take place between network members.

We follow this framework of TPB applying some modifications to fit with our settings of intermediate fertility in explaining our broader fertility model and our main postulate is that individual's actual fertility is determined by her fertility desire. In this research, we assume that social networks and reference group influence individual's desired and actual fertility, even when she actually does not have desires or means to have a child; or individual feels pressure to adjust her fertility regime when she knows the social norms on fertility through interactions with other members and media exposure. We present a case study in section 2.4 on a woman who really did not have own desire but have 3rd child due to social pressure. The gap between desired and actual fertility reduces when individual has the opportunity to learn about fertility ideals in the larger social networks. Social support of providing and exchanging information and knowledge on fertility ideals and FP, and child care support among the network members and reference groups help individual to adjust her fertility intention and behaviour in accordance with the social norms.

The assumption of TPB approach is that three background factors, i.e. individual, social, and information influence the construction of intentions indirectly. Billarri et al. (2009) assume that some of these background factors may have direct effect on the formation of intentions; they overlook the direct effects of these variables on fertility intentions. We assume social interactions and information factors through social norms influence individual's desires; and use the interdependent preference model of Pollak to explain our desired fertility.

13

2.2.2 Interdependent Preference: social norms and individual's desires

In modelling interdependent preferences of demand behaviour, Pollak (1976) assumes that preferences of consumer depend on other people's consumption. Easterlin et al. (1980) propose a general fertility determination model where they consider utility function of the family as endogenous to society; and develop lagged socialization model of interdependent preference manoeuvring Pollak's assumption. These models prefer to use lagged preferences where current preferences of individual depend on the past preferences of others; since, we have only cross-section data available we differ from this and apply simultaneous preference model which is more close to Duesenberry's (1949) social origin of tastes. Duesenberry (1949) assumes that people want a specific good because their culture, where they live, considers that good as superior and they feel strong social pressure to consume that good. In our analysis, we obtain the assumption of interdependent preferences of consumer behaviour that along with other factors, consumer's product choices is dependent upon preferences of other consumers or reference group (see Kapteyn et al. 1997). Here, we assume the impact of social learning process on individual's choices within the networks of family members, neighbours, friends, colleagues (Yang et al. 2006). Preference interdependence among these social partners is likely to be significant because of close proximity, exposure to same interventions and opportunities. In this research, we propose a model for estimating how individual's fertility desire is affected by the fertility desire of the other members of the society.

Figure 2.a
Schematic Presentation of the Theoretical Framework of Fertility
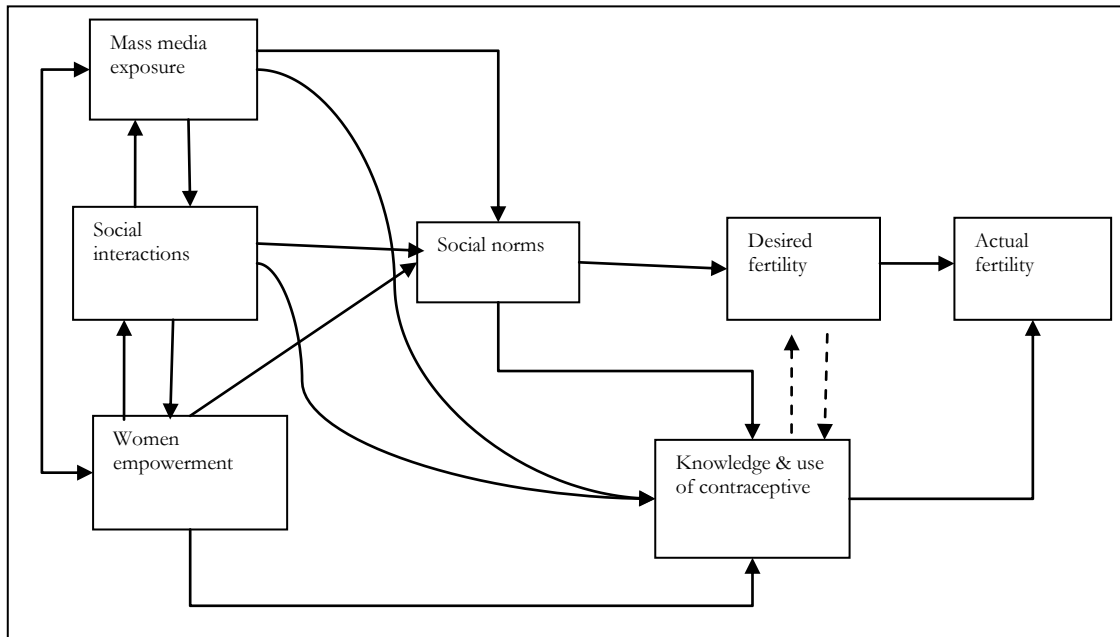
The theoretical framework in Figure 2.a predicts that exposure to the mass media and social interactions influence desired fertility (intentions or preferences) through social norms (group/others' preferences) and mass media, social interactions or social norms affect actual fertility (behaviour) through desired fertility. Women empowerment increases women's decision making power regarding childbearing. Here, we sense a link of contraceptive knowledge and use with actual or desired fertility, but focus of this research is not much on that link.

2.3   Research Hypothesis and Analytical Framework

This section portrays the assumptions and analytical tools that we drawn from our literatures, theories, and models which guided us throughout the whole research process.

2.3.1 Research hypothesis

With a broader objective of exploring the determinants of fertility by examining the sources of knowledge on social ideals and FP, we assume that mass media and social interactions are the channels of information. Since our research questions designate to identify the mechanisms of media and social interactions effects on the fertility regime of individual across socioeconomic groups, we attempt to assess the following hypothesis:

- Desired fertility affects actual fertility;
- Social norms directly affects desired fertility and affects the gap between desired and actual fertility;
- Exposure to mass media and social interactions affect desired fertility through their effects on social norms;
- The effects of social norms and desired fertility vary with socio-economic characteristics;
- Women empowerment is important for desired fertility and in reducing the gap between desired and actual fertility.

2.3.2 Analytical framework and conceptualizations

This section operationalizes the important concepts and assumptions depicted in theoretical and hypothetical inferences; and represents our analytical framework linking the determinants of desired and actual fertility in Figure 2.b. The description of the analytical framework moves from right side to left side of the figure 2.b where the solid lines depict the direct relations that assume in this research and the broken lines exhibit the indirect relation that are not adequately deals in this research.

The assumption is that the total number of actual births or living children a woman has throughout the reproductive span is the realization of

15

her desired fertility. In a perfect condition[11] the gap between desired and actual fertility would be zero, otherwise it either positive or negative. Regarding the issues in real life situation which is not so perfect to follow the hypothetical assumption, in our model we assume that contraceptive knowledge and use[12] has less effects on actual fertility because if individuals desire to have less children without any deliberate contraceptive knowledge and use they can limit births[13]; and the reverse can be possible.

Figure 2.b
Analytical Framework of Desired and Actual Fertility
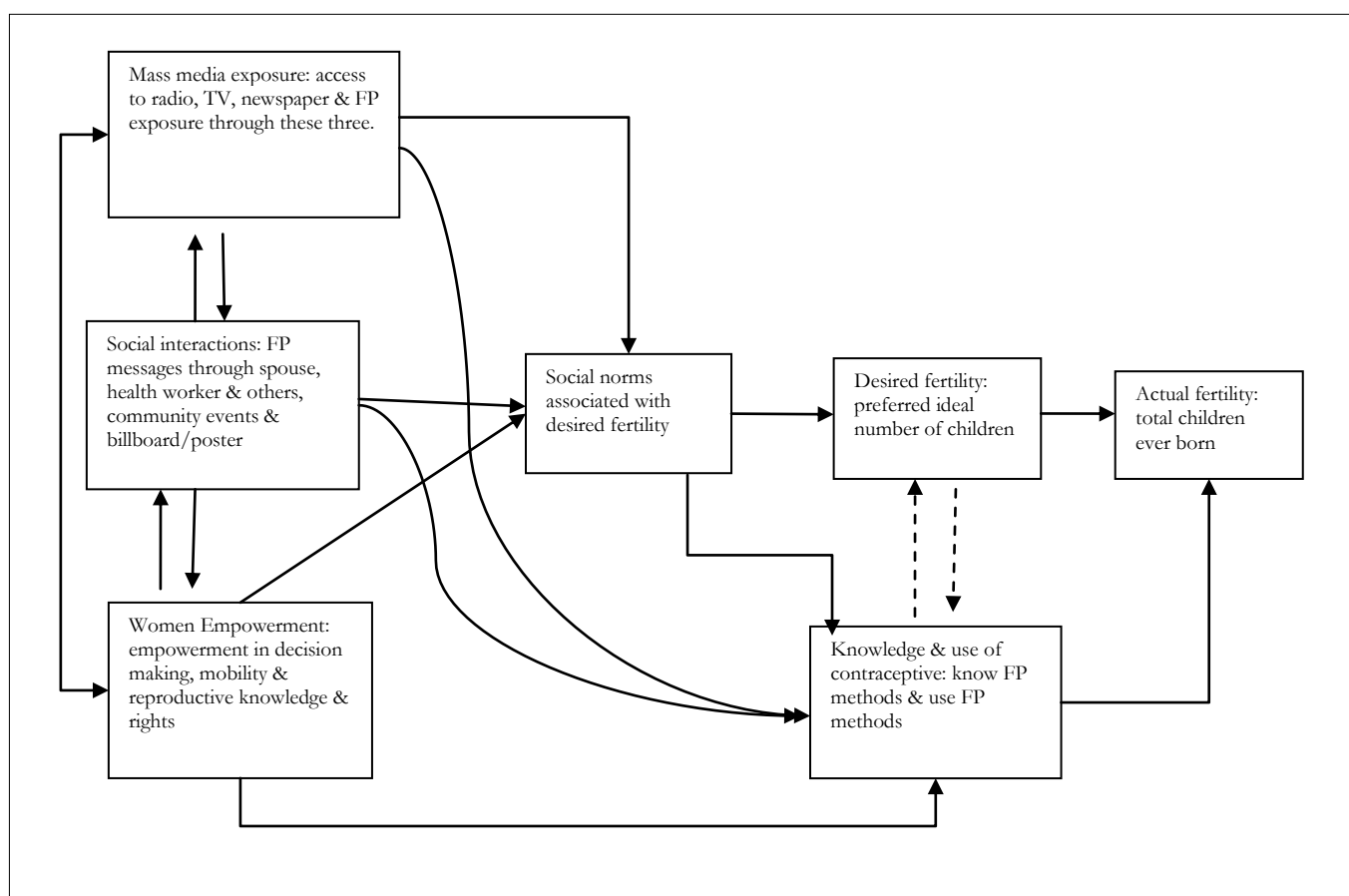
Desired fertility or the ideal number of children that a woman would like to have throughout the reproductive span depends on social norms, which is the source of social influence and pressure in conforming individual's behaviour to the collective expectations. One can assume the both-way relationship between desired fertility and contraceptive knowledge and use

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[11] i.e. less effects of child mortality, sex preferences, and drawbacks of contraceptive knowledge and use.

[12] any traditional or modern method of contraceptives for spacing, terminating or limiting pregnancies/child-bearing.

[13] By positive check or human rationality (Grimm 2003).

16

since individual's desired fertility determine whether she will be interested to know and use contraceptive as well.

Exposure and FP information through mass media and social interactions in individual and social levels influence social norms of fertility. Generally, mass media is referred to as exposure to television (TV), radio, newspaper, billboard campaigns and other print or electronics media. Here, individual's exposure to radio, TV, and newspaper/magazine and FP messages exposure through these media are considered as media and FP exposure.

Social interaction is referred as the process of social learning, influence and support that a woman has within her individual and social networks of husband, neighbours, parents, siblings, relatives, friends, colleagues, counsellors etc. Bongaarts and Watkins (1996) assume that exchange of information and ideas, joint evaluation of their meaning in specific setting, and social influence that constrains or encourages action are the relevant aspects of social interactions for fertility change. FP messages through spouse, anyone (including health worker), community, and poster/billboard and reference group pressure and support are considered as social interactions.

Our framework depicts that women empowerment in decision making, physical mobility and reproductive and sexual knowledge and rights empowered women regarding to make decision on her fertility regime. Moreover, we are aware of that individual's desired and actual fertility could determine her exposure to mass media and information collection through social interactions. For instance, who are already sterilized domiciliary services will not reach them; or they will not be interested in FP information or discussions.

2.4   Social Pressure & Effects of Reference Group

In social effect mechanisms, we assume that social pressure from network partners is crucial for individual's fertility regime. Intense social pressure from all social partners play important role having first child after marriage. But for next parities, potency of social pressure depends on preceding child's sex. For example, a case study can be illustrated here as:

Mina, an urban and educated health official, is a mother of three children. She was fifth parities of her parents' seven surviving children. She was much aware about the cost of having a large family; she never had intention to have more than two children. Her education enlightened her about quality-quantity trade-off. Moreover, being a working mother, in the view of altruistic parent she considered probable child care difficulties and opportunity costs of having more children when child care support is not available. But after having two daughters she was facing pressure to have third child from husband, and others, and even from her youngest daughter; she was demanding: *'mom (ammu), I want little brother ('bhaia babu')'*. Though, Mina never learned to make differentiation between son and daughter, she is now happy after having a son.

Moreover, the assumption of conventional population growth theories in fertility decisions still now play a crucial role in forming individual's desired and actual fertility. From FGD, we find the support for Notestein (1953) views

when participants mentioned the uncertainty of survival of the child even at older age because of unexpected and unnatural deaths (i.e. road accident, kidnap, murder, suicide) led people to have more children. Therefore, the gap between desired and actual fertility is still covered with uncertainty of child mortality (Grimm 2003). However, Bangladesh has made a progress in declining child mortality[14] over the years which is evidenced from the generational gap in reproductive behaviour.

General assumption is that parents' fertility behaviour can play important role in individual's fertility regime. But in Bangladesh, there is a significant gap between the two generations' fertility behaviour. From the fertility history of mother and siblings in our case study, we find, in both regions, respondents and their siblings have fewer births than their mothers; and siblings present the same fertility trends in most cases.

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[14] IMR and CMR have been declined respectively from 87 and 50 to 52 and 14 per thousand live births during the period of 1993-1994 to 2007 (NIPORT 2009).

Chapter 3   Research Methods, Data and Descriptive Analysis

This section describes the methodological procedures that have been followed; and presents the characteristics of data that allow us to build our model.

3.1   Methodology

The use of both quantitative and qualitative methods in population research encounters problem due to proper empirical evidence collection, less comparative strength of qualitative approach, and difficulties in merging the two procedures; however, this research applied quantitative method and qualitative research tool as well. This approach provides us the strength of analysis, gives wider knowledge, and at the same time, the statistical tools allow us to present the empirical evidence on the topic of complex issue like fertility preference and preference implementation that depends on individual psychology as well as real social environment. At first, descriptive statistics has been analysed to have ideas on the variables; and then econometric model has been devised to explain the relationship. Since number of children is ordered in nature we prefer to use ordered probit; and use Ordinary Least Square (OLS) for robustness check as it signifies unbiased estimation.

3.2   Qualitative Sample and Source

In qualitative analysis, we collected information on both individual and social levels fertility preferences by conducting five FGDs and eight case studies from July to August of 2011 following semi-structured guidelines (see appendix B1 and B2); and get in-depth insights and understandings on the effects of social norms, interactions, and communication on individual's desired and actual fertility. FGDs were administered in both rural and urban areas of Khulna (3 FGDs) and Sylhet (2 FGDs) among married women of all socioeconomic sections; and numbers of participants of a single FGD were at least seven.

In case study, we selected four one-child urban, educated, working mothers three of whom living in Khulna regions and one in Dhaka city[15]. In addition, we studied four more than two-child mothers from both Khulna and Sylhet regions. From case studies, this research has in-depth information on the role of social pressure/influence and social support in shaping individuals fertility intentions and behaviour by having information of reference groups.

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[15] Among them 2 daughter's and 2 son's mothers, and 3 of them have no desire for more children. Selection of cases was personal contact basis (couldn't contact with any one-child mother from Sylhet region).

3.3   Quantitative Sample and Source

For quantitative analysis, we use data set of BDHS 2007[16], which is designed to collect data on fertility, family planning, and maternal and child health under the authority of the National Institute of Population Research and Training (NIPORT) of the Ministry of Health and Family Welfare of Bangladesh. With financial and technical assistance of Macro International Mitra and Associates of Dhaka has implemented the survey; and data collection took place from 24 March to 11 August 2007.

BDHS 2007 utilizes a multistage cluster sample[17] based on the 2001 Bangladesh Census. About 10,996 ever-married women aged 15-49 and 3,771 men aged 15-54 from 10,400 households covering 361 cluster/sample points (urban-134; rural-227) throughout Bangladesh were interviewed (NIPORT 2009). Regarding fertility behaviour, in addition to fertility history and information on contraceptive use, the survey collected information about women's media and FP exposure, fertility preferences, and community level fertility discussion. For the present research, we have chosen women who are usual resident of the household; so the number of observation in individual level analysis is 10,088 ever married women of 15-49 age groups, and 361 clusters is our community level analysis unit.

3.3.1 Construction of Important Variables for Quantitative Analysis

3.3.1.1 Desired and actual fertility

To measure actual fertility of the individual, one can find different indicators in DHS dataset; total children ever born, number of living children, number of actual and living son and daughter etc. Since our concept on actual fertility is the realization of the desired fertility we considering total number of actual births to the women as actual fertility.

Empirically, numerous indicators are being used to measure desired fertility, i.e. intended family size, intention to have children, the intention of timing, certainty of intention, intentions of the partners (Spe´der and Kapita´ny 2009). From BDHS, we find ideal number of children and son or daughter, fertility preference, desire for more children, and last child or pregnancy wanted as competent indicators of desired fertility. Though many researchers (e.g. Pritchett 1994) think ideal number of children is not the best indicator of desired fertility and has some problem in estimating actual fertility because of well known concerns of prospective questions and ex-post rationalization[18] we considered ideal number of children as desired fertility of the individual since it

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[16]   Fifth nationally representative population and health survey (follow up to the 1993-1994, 1996-1997, 1999-2000, and 2004 BDHS surveys), a part of the Demographic Health surveys in worldwide.

[17] Details on sampling procedures can be found in MEASURES DHS.

[18] Responses to ideal no. of children may be influenced by the actual /alive birth that the woman already has (Pritchett 1994).

indicates the numeric pattern of fertility ideals or desired fertility. To measure desired fertility within the social networks of the individual we consider the average ideal number of children reported by the women living in the same cluster and considering as the proxy of social norms on desired fertility and social or neighbourhood influence on the individual's ideals.

3.3.1.2 Media and FP exposure

The original BDHS was not designed to analyse the effects of social networks on individual's fertility regime. However, data on FP exposure through mass media and interpersonal communications was collected and the survey was divided on the basis of individual, households, clusters, divisions etc. As a result, we are able to exploit data for media and social interactions variables in individual level and social level as well.

According to Bongaarts and Watkins (1996), group of people united by either spatial proximity (village, region), and/or social proximity (ethnicity, education, occupation) is the social channels of interaction through which information and ideas, evaluation, and social influence flow. Present research distinguishes two levels of social interactions-- individual level and social level. From BDHS dataset we consider whether women have access to media and FP messages through any of radio, TV, and newspaper/magazine as individual level media and FP exposure. FP exposure through poster/billboard, community events, FP counselling or services by anyone, discussion with spouse are considered as FP exposure through social interactions in individual networks. For cluster level media and FP exposure and social interactions we count average media accesses and FP exposures through media or social interactions within cluster.

3.3.1.3 Women empowerment

To operationalize women empowerment, we consider empowerment in decision making, physical mobility, and reproductive and sexual knowledge and rights (RSKR). From BDHS dataset, we choose some indicators which to us seem important to measure the extent of women empowerment

Empowerment in physical mobility is based on whether the respondent can go to the health centre alone, can make decision to visit family or /relatives, and her justification on domestic violence (DV) if wife goes outside without telling husband. Empowerment in decision making is measured from whether the respondent make decisions on spending money, daily HH purchases, major HH purchases, own health care, child health care, and justification on DV if wife argues with husband. For empowerment in RSKRs, we consider whether women know about STDs, AIDS, MR, ever have forced sex, and justification on DV if wife refuses sex with husband. Four empowerment indices have been constructed, i.e. over all empowerment index, mobility index, decision making index, and RSKRs index which are

constructed by Principal Component Analysis (PCA)[19] after generating dummy variables of three dimensions of empowerment[20] which allows creating empowerment index scores.

3.4 Descriptive Analysis

Since we want to show the social effects mechanism on individual's desired and actual fertility by documenting the fertility regimes of different socioeconomic groups, we provide descriptive statistics in Table 3.1a and 3.1b for the full sample, as well as for sub-samples in which we divide women by age, literacy, religion, place of residence, region, and wealth quintiles.

Starting with individual characteristics in column 1 of Table 3.1a, we see that women are on average 31 years old having roughly 4.4 years of schooling, while their husband has on average 5 years of schooling. In our full sample, only 31% women work. The women in our sample have entered marital life on average at the age of 15.4 years and have first child at the age of 17.8 years which results in having 2.9 births on average. Note that the number of children born here of course underestimated, because many women will continue to produce child; since, 9.17% women have not given birth yet and 18.72% have given birth only one child.

Looking across columns, we see that average schooling is lower among women of older group, rural area, Muslim, Sylhet region, and poor class than their comparison groups; and same for their husband's education. Interestingly, reverse is applicable for working status of the women, except Muslim and Sylhet region. Women in Sylhet region work less than any other comparison groups. Marital age of illiterate and rural women is much lower than national averages, but for Hindu women it is higher among all groups. Women in Sylhet though start having children later than all other groups of women (except Hindu) they have on average more births (3.52) than others; only older age group and illiterate women have more births than women in Sylhet. Considering household characteristics, on average women of Sylhet region has large household size (7.04) than any other groups. Here, one can assume the contribution of already large number of births; but surprisingly, rich class has the second highest household size (6.09); even larger than poor class (5.25).

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[19] Following the procedure of Filmer and Pritchett (2001) of constructing wealth index.
[20] Variables summary are in appendix B3.

	All	Age		Literacy		Religion		Residence		Region		Poor	Class	
		Below 30	30 & above	Illiterate	Literate	Muslim	Hindu	Urban	Rural	Khulna	Sylhet	Poor	Middle	Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Age (years)	31.1	22.8	38.5	34.02	28.80	31.06	31.41	31.47	30.87	31.37	31.77	30.67	30.89	31.51
	(9.28)	(3.88)	(5.74)	(8.97)	(8.87)	(9.28)	(9.25)	(9.1)	(9.38)	(9.46)	(9.43)	(9.07)	(9.54)	(9.32)
Education (years)	4.39	5.56	3.33	0.61[1]	7.38	4.34	4.91	5.6	3.65	4.72	3.24	2.29	3.5	6.33
	(4.39)	(4.18)	(4.31)	(1.29)	(3.61)	(4.37)	(4.57)	(4.84)	(3.91)	(4.41)	(3.89)	(3.08)	(3.66)	(4.66)
Husbands edu (years)	5.02	5.22	4.83	2.26	7.20	4.96	5.67	6.56	4.08	5.16	3.97	2.32	3.91	7.50
	(4.99)	(4.85)	(5.11)	(3.29)	(5.03)	(5.01)	(4.84)	(5.35)	(4.51)	(5.12)	(4.35)	(3.45)	(4.08)	(5.1)
Currently working	0.31	0.27	0.34	0.38	0.25	0.30	0.33	0.30	0.31	0.40	0.17	0.39	0.29	0.25
Marital age (years)	15.39	15.54	15.25	14.53	16.07	15.27	16.53	16.04	14.99	14.97	16.25	14.64	14.99	16.12
	(2.86)	(2.52)	(3.13)	(2.33)	(3.05)	(2.78)	(3.33)	(3.32)	(2.46)	(2.67)	(3.03)	(2.14)	(2.4)	(3.30)
Age at 1st birth (years)	17.79	17.34	18.14	17.28	18.23	17.68	18.87	18.28	17.50	17.65	18.54	17.25	17.39	18.38
	(3.21)	(2.62)	(3.57)	(3.06)	(3.27)	(3.16)	(3.46)	(3.49)	(2.99)	(3.22)	(3.37)	(2.87)	(2.88)	(3.49)
Total children born	2.88	1.68	3.95	3.62	2.29	2.92	2.5	2.62	3.04	2.45	3.52	3.22	3.02	2.56
	(2.07)	(1.24)	(2.07)	(2.21)	(1.74)	(2.09)	(1.8)	(1.88)	(2.16)	(1.73)	(2.53)	(2.17)	(2.15)	(1.90)
HH size	5.69	5.66	5.72	5.51	5.83	5.66	6.00	5.73	5.66	5.10	7.04	5.25	5.51	6.09
	(2.81)	(3.05)	(2.58)	(2.46)	(3.05)	(2.81)	(2.80)	(2.76)	(2.84)	(2.37)	(4.01)	(2.22)	(2.46)	(3.25)
Observations	10088	4767	5321	4454	5634	9094	940	3829	6259	1591	1373	3517	1907	4664

Notes: standard deviation in parenthesis.1 In education variable, though some reported of having education or schooling they could not read at the time of survey and are considered as illiterate.

Source: Own estimation.

Table 3.1b presents the average media and FP exposure and social interactions for our full sample and sub-samples. We observe that though women have variations in socioeconomic and demographic characteristics (presented in Table 3.1a), these groups display relatively similar statistics on media exposure, social interactions, contraceptive knowledge and use. Though all women has relatively low exposure to media and social interactions almost all respondent knows about modern contraceptive methods and they start using contraceptive with on average 1.6 live births. Nationally, majority of the women (.70) reported that their husband has the same desire number of children.

Across the columns, we find that though women in various socioeconomic groups have relatively similar statistics on media and FP exposure there is a variation in using FP method. On average rich, urban and literate women are more likely exposed to TV watching and FP messages through TV than other groups. Though women in Sylhet are more likely read newspaper than women in Khulna, they are less exposed to FP messages through this media than Khulna implies that media exposure essentially does not yield in FP exposure. We can find very little variations across different socioeconomic groups in terms of FP messages by anyone or domiciliary service; in addition, younger and literate women is more likely talk often with husband about FP.

Women in Sylhet start contraceptive later (2.5 child first use) than all groups; women in Khulna start after having on average 1.4 children. Younger generation starts contraceptive having on average .84 children (the lowest across all groups). Though women of all groups have the knowledge of contraceptives, in using Sylhet women are far behind than others. Across the class, though poor and rich class differ much in media and FP exposure, we cannot observe that level of variations among them in terms of FP discussion with husband, FP knowledge and use; even in spouse desire. We find a significant variation in spouse desire among religious group.

Figs. A1 and A2 in appendix show that though majority of the women have more than two surviving children, their ideal number is two; and we find variations regarding two children as ideals among socioeconomic groups[21]. In FGD in Khulna regions, participants of village areas support the two-child policy and they do not agree with one-child policy. Urban women recognize one child as best for them since child care support from relatives are not available in a nuclear family; however, they face social pressure to have more than one child because of child mortality, companion for child, and son preferences. Reversely, in Sylhet region, though some participants think fewer children are good because of economic hardship most of them consider more than two children as better for the certainty of getting old-age support from sons. Both egoistic and altruistic intergenerational links pronounced in utility functions of desired fertility in both regions (see Grimm 2003).

Most of the women do not have any kind of media and FP exposure (Fig. A3); in addition, access to media does not yield in FP exposures. FGDs

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[21] For instance Khulna (76%) and Sylhet (51%).

Table 3.1b
Access to Media and FP Information and Contraceptive Use

	All	Age		Literacy		Religion		Residence		Region			Class	
		Below 30	30 & above	Illiterate	Literate	Muslim	Hindu	Urban	Rural	Khulna	Sylhet	Poor	Middle	Rich
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Read newspaper	0.28	0.26	0.32	0.67[1]	0.29	0.29	0.27	0.39	0.20	0.24	0.33	0.12	0.16	0.38
Listen radio	0.22	0.26	0.19	0.16	0.27	0.218	0.23	0.18	0.24	0.23	0.19	0.16	0.25	0.25
Watch TV	0.55	0.59	0.51	0.39	0.67	0.54	0.59	0.76	0.41	0.58	0.43	0.27	0.42	0.81
FP on radio	0.11	0.13	0.10	0.07	0.14	0.11	0.12	0.09	0.12	0.12	0.0	0.09	0.13	0.12
FP on TV	0.32	0.36	0.28	0.18	0.43	0.32	0.35	0.47	0.22	0.33	0.25	0.11	0.21	0.52
FP on newspaper	0.04	0.04	0.04	0.0002	0.08	0.04	0.05	0.08	0.02	0.04	0.03	0.004	0.01	0.09
FP by anyone	0.19	0.20	0.18	0.17	0.21	0.19	0.21	0.17	0.20	0.22	0.16	0.21	0.20	0.17
FP on billboard	0.11	0.12	0.10	0.04	0.16	0.11	0.11	0.17	0.07	0.12	0.06	0.04	0.06	0.18
FP in community	0.02	0.02	0.02	0.01	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.03
FP talk spouse: never	0.55	0.47	0.63	0.63	0.50	0.55	0.54	0.52	0.57	0.55	0.64	0.58	0.57	0.53
Once/twice	0.35	0.41	0.29	0.31	0.38	0.35	0.36	0.36	0.34	0.35	0.28	0.34	0.35	0.36
More often	0.10	0.12	0.08	0.06	0.12	0.10	0.10	0.11	0.09	0.09	0.08	0.08	0.08	0.12
Know modern method	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.99	0.99	0.99
Use modern method	0.76	0.76	0.76	0.70	0.81	0.76	0.79	0.82	0.73	0.84	0.48	0.72	0.74	0.80
Alive child at first use	1.6	0.84	2.26	2.25	1.14	1.61	1.47	1.35	1.76	1.35	2.51	1.89	1.78	1.32
	(1.60)	(.88)	(1.78)	(1.76)	(1.29)	(1.62)	(1.39)	(1.43)	(1.68)	(1.41)	(2.10)	(1.69)	(1.66)	(1.45)
Spouse desire same	0.70	0.75	0.66	0.65	0.75	0.50	0.77	0.71	0.70	0.68	0.61	0.68	0.70	0.72

Notes: observations same as previous table for each column, Standard Deviation in parenthesis

1 Among newspaper readers, in dataset, 2 respondents are illiterate which question the authenticity and reliability of the variable, so here, we avoid make comparison of this group for this particular variable. But for our next econometrics analysis, this will not cause threats, since we used combined media exposure. Source: own estimation.

participants in Sylhet did not mention TV or radio as easy source of contraceptive knowledge. However, though participants in Khulna mentioned media as source of FP knowledge, they couldn't exactly mention any TV or radio program regarding this. From the case study, the same trends observed; since most of them do not watch national TV channels (even in rural areas), they mention TV soap opera of India; and one can assume that National TV channels have less effect on reproductive behaviour. That might be cause of women are already informative about FP, they do not need more awareness, or the timing of the FP messages on the media, or the contents of the FP messages do not allow them to be exposed since TV watching is a familial event in most of the family in Bangladesh. In both regions, FWA (health worker) is considered as the first and easy source of getting FP information.

Chapter 4   Model Specification

We propose mainly two models in this research-- the interdependence between preferences of the individual and social group; the interdependence between individual's behaviour and preferences. Within this framework, we intend to model desired and actual fertility in respect to women empowerment as well.

4.1   A Model of Interdependent Fertility Desires

One of the important objective of this research is to explain variations in fertility among different socioeconomic groups and we find regional variation exhibits more significant variations; hence, decide to rely on influence of spatial proximity model where fertility regime of individual is influenced by fertility norms of social group living in a same geographic location. Though, in reality, the relationship between social settings and individual's fertility is not straightforward; and might be an argument of both-way relation, we assume that people living in a same social environment in most cases demonstrate the same desires. Moreover, we are aware of that, urban spatial proximity doesn't mean that woman will interact with other women within the same cluster. As some other unobserved individual characteristics could also generate a spurious correlation we control some additional variables in our model, such as age, religion, education, husband's education, contraceptive knowledge and use, place of residence, and wealth quintiles.

We first present OLS model aimed at estimating the determinants of social norms; and then preference interdependence between individual and preferences of other members in the cluster.

At first, we consider a model where social norms are determined by media and FP exposure through media and social interactions in social networks or channels, so the model is:

$$AINC_{ci} = \beta'_{AFP} AFP'_{ci} + \varepsilon_i \tag{1}$$

Average ideal number of children within cluster, $AINC_{ci}$, the continuous variable for cluster i which is function of AFP_{ci}, the vector of average media and FP exposure within cluster i and ε_i the unobserved mean-zero error term. Then, we model individual's desire as the function of social desire as follows:

$$INC_i = \beta_{AINC} AINC_{ci} + \beta'_1 X'_i + \varepsilon_i \tag{2}$$

Where INC_i, desired fertility of individual i, is the function of $AINC_{ci}$, the social norms in cluster i, X'_i, the vector of other control variables in individual level and ε_i, the error term. In addition, we estimate Equ. (3) by including predicted variable of $AINC_{ci}$; Equ. (4) by cluster level other media and FP

exposure variables, AFP_{ci}; and Equ. (5) by individual level media and FP exposure and social interactions variables, MSI_i, as follows:

$$INC_i = \beta_{AIN\hat{C}}AIN\hat{C}_{ci} + \beta_1'X_i' + \varepsilon_i \qquad (3)$$

$$INC_i = \beta_{AFP}'AFP_{ci}' + \beta_1'X_i' + \varepsilon_i \qquad (4)$$

$$INC_i = \beta_{MSI}'MSI_i' + \beta_1'X_i' + \varepsilon_i \qquad (5)$$

The OLS estimation of desired fertility on media and FP exposure is subject to a number of arguments and biases that is if individual wants to reduce fertility or have certain preferences, needs to know more about FP messages or contraception; so she will try to get access to media or try to interact with others within her networks. Unobserved child care time-management may reduce media exposure; reversely, increased media exposure expects to reduce time for child care; therefore, individual desires fewer children. Media access correlates with household expenditure which may require desires for fewer children. Therefore, here mass media is not exogenous; it is endogenous. In order to have an unbiased estimate of desired fertility on media exposure, we use Two Stage Least Square (2SLS) and instrument media exposure with access to electricity; and to be a good instrument for studying the impact of media exposure on desired fertility it must meet the condition of relevance (endogeneity) that is access to electricity has to be sufficiently correlated with desired fertility; and condition of exogeneity that is electricity access must not be correlated with unobserved determinants of desired fertility which presumes that access to electricity influences desired fertility only through its effects on media exposure. Though exogeneity problem is hard to test, from theoretical assumption there is no point, indeed, to assume electricity access has a direct impact on desired fertility. One can argue, there are many indirect effects via mass media since electricity allows people to use machineries in agriculture or more time investment in child care (i.e. helping kids in education at night) due to electricity access; consequently, they will prefer fewer children. The equation can be written as:

$$MM_i = \delta_Z Z_i + \beta_X'X_i' + \nu_i \qquad (6)$$

Where, $E(MM_i | Z_i) \neq 0$ and $E(\varepsilon_i | Z_i) = 0$

Instrumental variable (IV), Z_i, is the electricity access of the household that is more likely related to mass media exposure, but does not have direct effect on ideal number of children.

While estimating OLS we have to drop less than 3% observations (nonnumeric 0.08%; whatever God gives 2.17% responses); and we do not expect a significant attribution bias in estimation. However, since desire number of children is ordered in nature and the qualitative responses to desire is clearly showing the independence on social reality or their living outcomes; moreover, with an intermediate TFR, which factors affect the desire of this

2.26% is important for our analysis. So, we categorize our dependent variable ideal number of children as:

      1= less than two children,

      2= two children,

      3=more than two and

      4=whatever God gives[22].

And we estimate ordered probit model[23] which identifies statistical significant relationships between dependent and independent variables like OLS, but the advantage over OLS is that ordered probit does not assume equal differences between ordinal categories; it captures the qualitative differences between different categories of dependent variable. So, we assume that individual's desire is driven by the latent desires, or unobserved INC^*_i, and which have the following relationships with the observed desires:

$INC_i = INC^*_i$ if $INC^*_i > 0$ and $INC^*_i = 0$ if $INC^*_i \leq 0$. We assume that latent desire is normally distributed, where, $INC^*_i \sim N(\mu_i, 1), i = 1,....., N$ and $\mu_i = Z'_i \beta$.

We incorporate interdependence in individual's latent desires in the following structural manner:

$$INC^*_i = \beta_{AINC} AINC_{ci} + \beta'_1 X'_i + \varepsilon_i \qquad (7)$$

Where $\varepsilon_i \sim iid \ (0 \ \sigma)$.

$AINC_{ci}$, average ideal number of children in cluster of the individual, X'_i, vector of other control variables and ε_i, error term determine INC^*_i, latent desire of the individual i. So, the ordered probit stipulates an observation mechanism such as,

$INC_i = \kappa$ if $\tau^{k-1} \leq INC^*_i < \tau_k$ for $\tau_0 = -\infty, \forall i \ \& \ k = 1,......,4$

Also, it follows from the set-up of the model that $\tau_1 < \tau_2 < \tau_3$ and $\beta_0 = 0$. Given this structure, the probabilities of responding in any given category k= 1, ..., 4, conditional on a vector of covariates Z_i, can be derived as:

---

[22] Here, one can argue that non-numeric and whatever God gives does not essentially mean to be considered as higher order desire, and we too aware of it. From our preliminary data exploration, we find that the respondents who have given these two qualitative responses, about 75% have more than two actual births, and 9% do not have any birth yet. Considering this issue, we assume both qualitative responses as whatever God gives giving higher order.

[23] Ordered logit can be used as both give very similar result; since ordered probit assume error term normally distributed we apply it.

$$INC_i = 1 \text{ if } INC^*_i \leq \kappa_1$$

$$INC_i = 2 \text{ if } \kappa_1 \leq INC^*_i \leq \kappa_2$$

$$INC_i = 3 \text{ if } \kappa_2 \leq INC^*_i \leq \kappa_3$$

$$INC_i = 4 \text{ if } INC^*_i \geq \kappa_3$$

4.2   A Model of Planned Fertility and Behaviour

This section provide model to estimate individual's fertility behaviour on fertility choices by using desired children view. We choose our model of actual births on ideal number of children; and we know there might be a question on avoidance role of child mortality. But if we estimate model of surviving children, it excludes on average 0.35 births; consequently, we model behaviour equation on the basis of actual births. However, for robustness check we estimate our model by using all potential indicators (to us) of actual and desire fertility.

The control variables include almost same as previous section. Since this model assumes implicitly that individual would give birth in respect to her own desires, in practice, some other unobserved characteristics may also generate a spurious correlation; hence, we control some additional variables, i.e. age at first marriage-- it is assumed that earlier marriage yields in more births; marital duration-- longer the marital duration, higher the actual births; sex of the first child-- it is expected that first parities daughters yield in more births due to child bearing continuation; contraceptive use-- reduces the actual births; first child alive-- reduces the number of births.

From our FGD and case study, we find that sex of the child play role in fertility implementation; status of women and family also depends on sex of the child that results in having more births than desires. In Bangladesh, traditionally, female child is not much welcome and women's status is determined by the ability to give birth of son; it has not been changed much. Even if man does not have son they cannot pass their title; therefore, have a feeling of less status in society. An case can be illustrated, as:

An academician, Nahar, after having first child feels that her status in the family has declined being a daughter's mother. Her youngest sister-in-law (not educated) has become mother of son few days later of her; and the mother-in-law and others are now more concern about the wellbeing of the son's mother. Nahar, now, intends for next child.

The specification that includes the all control variables described above as well as unobserved determinants of the actual births is as follows:

$$AF_i = \beta'_{INC} INC'_i + \beta'_X X'_i + \varepsilon_i \qquad (8)$$

Where, AF_i, actual birth, is the function of INC_i', the vector of desired fertility of the individual i , X_i', the vector of other control variables, and ε_i , the mean-zero error term.

Since the number of actual birth is ordered in nature, we estimate ordered probit by categorizing dependent variable the number of actual births as:

> 1= less than two children,
>
> 2= two children,
>
> 3=three to five children and
>
> 4=six and more children.

So, our model for ordered probit assuming, AF_i^*, a latent behaviour of actual births estimation is:

$$AF_i^* = \beta_{INC}' INC_i' + \beta_1' X_i' + \varepsilon_i \qquad (9)$$

Where $\varepsilon_i \sim iid \ (0 \ \sigma)$.

4.3 A Model of Women Empowerment and Fertility

Traditionally, in Bangladesh other family members and relatives influence women's fertility desires; consequently, fertility realization. Our women empowerment model assumes that how many children a woman would like to have or gives births somehow depends on how much she has been empowered regarding physical movement, decision making, and reproductive and sexual knowledge and rights. Therefore, the two models are as follows:

$$INC_i = \beta_{WE}' WE_i' + \beta_X' X_i' + \varepsilon_i \qquad (10)$$

$$AF_i = \beta_{WE}' WE_i' + \beta_X' X_i' + \varepsilon_i \qquad (11)$$

where, INC_i or AF_i, ideal number of children or number of actual births of woman i, is the function of WE_i', the vector of women empowerment, X_i', the vector of controls and ε_i, the mean-zero error term.

Chapter 5   Results

In section 5.1, we present results showing effects of social learning, interactions, and norms on desired fertility. Section 5.2 discusses the empirical result of effects of desired fertility on actual fertility. Finally, in section 5.3 and 5.4, we present the results of the effects of women empowerment on desired and actual fertility; and the determination of the gap between desired and actual fertility.

5.1 Desired Fertility, Social Norms and Social Interactions

This section addressed second and third hypothesis; and fourth hypotheses partially regarding desired fertility. This study examines the influence of social norms on fertility desires and mechanisms of social effects. Assuming cluster as a social unit of influence networks, average ideal number of children for each cluster is considered as the social norms of that cluster where the woman lives. We estimate cluster ideals on media and FP exposure within cluster to explore their effects on social norms and found that higher the media and FP exposure within cluster lower the cluster ideals (result is not presented).

Three ordered probit regression results of desired fertility estimation are presented in Table 5.1, where specification 1 includes cluster ideals, specification 2 on predicted cluster ideals, and specification 3 on media and FP exposure in cluster including other control variables.

In specification 1, from the coefficient we see that one unit increase in cluster ideals increases the chance of women to declare higher order desire by 2.1 units, implies that social norm is significantly associated with higher order desires of the individual. From the marginal effects, it is observed that whose ideal is two children are less likely influenced by cluster ideals; on the other hand it has more effects on who declares more than two as fertility ideals. Cluster ideals reduces women's chance of having fertility ideals of two children by 51.9%, whereas the probability of having ideals as more than two children and whatever God gives increase by 61.1% and 4.9% respectively. In specification 2, we find that predicted cluster ideals has positive and significant effects on desired fertility; depicts that other factors are contributing to higher order desires of the individual. In specification 3, we use only media and FP exposure in cluster; and find that all these variables have negative effects on fertility ideals which represents that media and FP exposure in social networks increase women's probability to declare lower order desire and decrease the chance to be in higher order desire. A woman 16.5% or 1.8% less likely declares her ideals as more than two children or whatever God gives if she has media access within her cluster. Similarly, visit by anyone or domiciliary services has negative effects on fertility ideals; if a woman has domiciliary services within her networks, her probability to declare more than two children decreases by 7.4%. From here, we can observe that social norms and FP exposure within same social networks has contradictory effects on individual's desired fertility.

32

Table 5.1
Desired Fertility, Social Norms and Social interactions

	OPROBIT (coeff.)	Dependent Variable: Ideal Number of Children			
		Marginal effects			
		Less than two	Two children	More than two	Whatever God gives
	(1)	(2)	(3)	(4)	(5)
Specification 1:					
Cluster ideal	2.114***	-0.140***	-0.519***	0.611***	0.049***
	(0.080)	(0.008)	(0.023)	(0.024)	(0.004)
Specification 2:					
Predicted cluster ideal	1.230***	-0.094***	-0.297***	0.353***	0.038***
	(0.118)	(0.010)	(0.029)	(0.034)	(.004)
Specification 3:					
Media access within cluster	-0.574***	0.044***	0.139***	-0.165***	-0.018***
	(0.101)	(0.008)	(0.025)	(0.029)	(0.003)
FP in media within cluster	-0.237*	0.018*	0.057*	-0.068*	-0.007*
	(0.128)	(0.010)	(0.031)	(0.037)	(0.004)
FP in poster within cluster	-0.006	0.0004	0.001	-0.002	-0.0002
	(0.162)	(0.012)	(0.039)	(0.047)	(0.005)
Anyone visit for FP within cluster	-0.259***	0.020***	0.063***	-0.074***	-0.008***
	(0.083)	(.006)	(0.020)	(0.024)	(0.003)
FP discussion in community	-0.059	0.005	0.014	-0.017	-0.002
	(0.387)	(0.030)	(0.094)	(0.111)	(0.012)
Share of Muslim in cluster	-0.857**	0.065**	0.207**	-0.246**	-0.027**
	(0.402)	(0.031)	(0.097)	(0.115)	(0.013)
Share of Hindu in cluster	-0.814**	0.062**	0.197**	-0.233**	-0.025**
	(0.409)	(0.031)	(0.099)	(0.117)	(0.013)
Control variables[1]					
Age controls	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√
Contraceptive controls	√	√	√	√	√

Notes: Age controls include age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use. Each specification (specs. 1, 2 and 3) from different ordered probit specifications by using different main interest explanatory variables (spec.-1: ideal no. of children in cluster, spec.-2: predicted cluster ideals and spec.-3: cluster level media and FP exposure) including same controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses2. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

In Table 5.2, Col. 1-3 evidence whether the results are robust to alternative OLS specifications for the same variables used in ordered probit specifications. In addition, columns 4-6 presents estimations by using individual levels media and social interactions as explanatory and instrumented media exposure with access to electricity. In all cases, the estimates are quite consistent to those of ordered probit estimations.

The results of OLS regression in Column-1 shows a positive and significant coefficient of the cluster ideals on the individual's fertility ideals indicating that social norms contribute to shape individual's fertility desires. The estimate result indicates that one unit increase in cluster ideals increases

individual's ideal number of children by 0.94 units. Moreover, media and FP exposure in cluster has 35.0 and 10.8 percentage point negative and significant effects on ideal number of children which implies that availability of media and FP exposure within cluster reduces fertility desires of the individual. In Column-4, the results of individual levels media and social interactions depict that if woman is exposed to media and FP messages in personal level, her fertility ideals decline by 10.5 and 2.9 percentage points mean that media and FP exposure in individual level contribute to reduce desired fertility as well. In addition, FP on poster reduces desired fertility by 4.4 percentage points.

Table 5.2
Determinants of Desired Fertility

	Dependent Variable: Ideal Number of Children										
	(1)		(2)		(3		(4)		(5)		(6)	
	OLS Coeff.	S.E.	OLS Coeff.	S.E.	OLS Coeff.	S.E	OLS Coeff.	S.E.	First Stage	S.E.	2SLS	S.E.
Specification 1:												
Cluster ideal	0.941***	0.047										
Specification 2:												
Predicted cluster ideal			0.545***	0.056								
Specification 3:												
Media access within cluster					-0.350***	0.061						
FP in media within cluster					-0.108	0.071						
FP in poster within cluster					-0.038	0.089						
Anyone visit for FP within cluster					-0.065	0.047						
FP discussion in community					-0.345	0.217						
Share of Muslim in cluster					-0.555***	0.198						
Share of Hindu in cluster					-0.540***	0.203						
Specification 4:												
Media access							-0.105***	0.022			-0.221	0.227
FP in media							-0.029*	0.017	0.369***	0.008	0.015	0.087
Anyone visit for FP							-0.015	0.018	0.018*	0.010	-0.013	0.020
FP on poster							-0.044*	0.023	-0.043***	0.011	-0.049*	0.029
FP discussion in community							-0.023	0.045	0.039**	0.020	-0.019	0.054
FP talks with husband (never ref.)												
Once or twice							-0.011	0.017	-0.016*	0.009	-0.013	0.018
More often							-0.034	0.023	0.007	0.013	-0.033	0.028
IV: Access to electricity									0.104***	0.013		
Control variables (see endnote 1)												
Age controls	√		√		√		√		√		√	
Socioeconomic controls	√		√		√		√		√		√	
Contraceptive controls	√		√		√		√		√		√	
First stage F-Stat									78.35			

Notes: Age controls include age and age square; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use. . Each specification (specs. 1, 2, 3 and 4) from different OLS specifications by using different main interest explanatory variables (spec.-1: ideal no. of children in cluster, spec.-2: predicted ideal number children, spec.-3: cluster level media and FP exposure and spec.-4: individual level media and FP exposure) including same controls for each. In cols. 5- 6 first stage and 2SLS regressions. Standard errors (S.E.) are robust. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Columns 5-6 present First stage and 2SLS estimations using the electricity access of the household as an exogenous determinant of desired

fertility. The large F-statistics (78.35) in first stage, indeed, confirm the importance of access to electricity on media exposure and are well above the rule-of-thumb values (see Staiger and Stock 1997). But given the IV estimates in Column-6 where media exposure effect becomes insignificant to ideal number of children, if we consider endogeneity problem, we cannot exclude the possibility of the effect from desired fertility to media exposure and not the other way around.

These OLS estimations depict that social norms increases individual's probability to have higher desired fertility, whereas media and FP exposure and social interactions reduce this possibility like our previous ordered probit estimation.

For more robustness checks, we estimate separate regressions including media and FP exposure in cluster, and cluster ideals in the same estimation; and find social norms is still significant and coefficient magnitude is nearly same. In addition, we estimate ordered probit for desired fertility on media and FP exposure and social interactions in individual level (Table A1) and find consistent result with OLS in previous table.

To test our assumption on complementary and contradictory role of media and social interactions on desired fertility we estimate separate regression by excluding social interaction variables in one regression, and another one by excluding media variables (result not presented); and compared with specification-4 of table 5.2, and individual effects of Table A1; and find consistency in significance and direction in three estimations for all of these variables; and changes in magnitude is very negligible implies that media exposure and social interactions are not in conflict in fertility desires. Moreover, though interaction terms of media and social interactions (Table A1) are not significant in ordered probit, in OLS estimation we find significant effects of media exposure and FP exposure in media if woman also has FP exposure in her social settings, for instance, community discussion or FP exposure on poster or billboard yields that jointly they may have significant effects on desired fertility.

General assumption is that since individuals' choices match across the society, individuals of same life chances tend to have same desires as well. In general (and from descriptive statistics), we would expect younger generation, educated, urban, and rich woman are more likely exposed to FP messages through mass media and social networks; and there is a significant variations in the effects of media and FP exposure and social norms across these socioeconomic groups everything else being equal. Moreover, we would expect regional and religious variations in effects. To test this assumption, we introduce interaction terms of socioeconomic groups with both social norms and individual level media and FP exposure. In Table 5.3 (full result is not presented) we find that both individual effects and interaction effects of social norms and socioeconomic groups are insignificant on desired fertility regarding to most of the socioeconomic characteristics; however, interaction effects of age and literacy in OLS estimation and literacy in ordered probit is significant means that being a literate woman social norms has negative effects on her desired fertility. In addition, we find significant interaction effects of media and

FP exposure on desired fertility across socioeconomic groups regarding wealth quintiles, religious, and regional variations (Table A2).

Table 5.3
Effects of Social Norms and Socioeconomic Groups on Desired Fertility

	Dependent Variable: Ideal no. of children							
	Individual Effects		**Interaction Effects**					
	OLS Coeff.	Oprobit (Coeff.)	OLS	Oprobit (Coeff.)	Marginal Effects			
					Less than two	Two children	More than two	Whatever God gives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification 1: literacy								
Cluster ideal	0.944*** (0.047)	2.126*** (0.080)	1.095*** (0.064)	2.270*** (0.102)	-0.153*** (0.009)	-0.556*** (0.028)	0.658*** (0.031)	0.052*** (0.004)
Literate	-0.048*** (0.018)	-0.092*** (0.030)	0.673*** (0.155)	0.535** (0.256)	-0.039* (0.021)	-0.123** (0.054)	0.151** (0.069)	0.012** (0.006)
Cluster ideal x literate			-0.309*** (0.069)	-0.275** (0.112)	0.019** (0.008)	0.068** (0.028)	-0.080** (0.033)	-0.006** (0.003)
Specification 2: religion								
Cluster ideal	0.941*** (0.047)	2.114*** (0.080)	1.139*** (0.351)	2.179*** (0.138)	-0.145*** (0.010)	-0.535*** (0.037)	0.630*** (0.041)	0.050*** (0.005)
Muslim	0.082 (0.107)	0.186 (0.170)	0.598 (0.874)	0.335 (0.293)	-0.029 (0.031)	-0.065 (0.042)	0.089 (0.069)	0.006 (0.004)
Hindu	-0.056 (0.109)	-0.081 (0.176)	0.820 (0.890)	0.083 (0.419)	-0.005 (0.024)	-0.021 (0.112)	0.024 (0.126)	0.002 (0.011)
Cluster ideal x Muslim			-0.190 (0.351)	-0.056 (0.091)	-0.005 (0.024)	0.014 (0.022)	-0.016 (0.026)	-0.001 (0.002)
Cluster ideal x Hindu			-0.351 (0.358)	-0.063 (0.159)	0.004 (0.011)	0.0155 (0.039)	-0.018 (0.046)	-0.002 (0.004)
Control variables (see endnote 1)								
Age controls	√	√	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√	√	√

Notes: Age controls include age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use. Each specification (specs. 1-2) from different OLS and ordered probit specifications for specific group. In columns 1 and 2 OLS and oprobit coeffs. Of individual effects and columns 3 and 4 interaction effects by using specific interaction terms of interest (spec. 1: 2-literacy and 2: religion cluster ideal) including other same controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

We also conduct several other test of robustness, using alternative dependent variables, i.e. fertility preference and desire for more children (Table A3). We find similar patterns.

5.2 Determinants of Actual Fertility

In this section, our aim is to estimate actual fertility on the desired child view to test the first hypotheses. In our actual fertility model, dependent variable is how many children have ever born to a woman or actual births; and it is hypothesized that the more children a woman desired, the more children she is likely to have actually.

Table 5.4
Effects of Desired Fertility on Actual Fertility

	OPROBIT (coeff.)	Marginal effects			
		less than two	Two children	Three to five	Six & more
	(1)	(2)	(3)	(4)	(5)
Desired fertility (less than one ref.)					
Two children	0.634***	-0.101***	-0.148***	0.218***	0.030***
	(0.075)	(0.015)	(0.015)	(0.026)	(0.004)
More than two children	1.010***	-0.100***	-0.263***	0.267***	0.096***
	(0.079)	(0.007)	(0.019)	(0.014)	(0.012)
Whatever God gives	1.154***	-0.069***	-0.285***	0.179***	0.175***
	(0.132)	(0.004)	(0.023)	(0.013)	(0.036)
Control variables[3]					
Age controls	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√
Contraceptive controls	√	√	√	√	√
Fertility controls	√	√	√	√	√

Notes: Age controls include age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; fertility controls include marital duration, age at first birth, first child alive, first child daughter. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

From ordered probit coefficients in Table 5.4, we see that higher the preference of more children, higher the score get in the ordered probit. From the predicted value of each fertility outcome given the explanatory variables, the differences are not very large; but here the highest order or whatever God gives, indeed, increases the probability of having more children. If women declare preference of two children, they are more likely to have three to five children. On the other hand, more than two children and whatever God gives preferences reduce the probability by 26% and 28% of having two children as actual births. In addition, if preference is whatever God gives, woman is 18% more likely than others to have six and more children.

In our robustness check, along with OLS estimation on desired fertility we estimate further regressions by including social norms, media and FP exposure variables in separate attempts (Table A4). The OLS estimation result in column-1 is consistent with ordered probit of Table 5.4. After including other variables in column 2-4, the predictability power of desired fertility still significant; though, the magnitude has decreased slightly that implies that preferences matter a lot for fertility outcome but fertility preferences is not much captured or well captured by mass media and social interactions variables. Here, we can assume that though media or social interactions have direct effects on individuals actual fertility, desired fertility is the most significant determinants.

Table 5.5
Effects of Desired Fertility and Socioeconomic Groups on Actual Fertility

	Individual Effects		Interaction Effects		Marginal Effects			
					Dependent Variable: Total Children Ever Born			
	OLS Coeff.	Oprobit (coeff.)	OLS Coeff.	Oprobit Coeff.	Less than two	Two children	Three to five	Six & more
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification 1: residence								
Desired fertility (less than two ref.)								
Two children	0.323***	0.634***	0.495***	0.839***	-0.140***	-0.185***	0.286***	0.039***
	(0.057)	(0.075)	(0.091)	(0.124)	(0.026)	(0.020)	(0.040)	(0.005)
More than two	0.719***	1.010***	0.911***	1.218***	-0.115***	-0.308***	0.295***	0.128***
	(0.065)	(0.079)	(0.098)	(0.128)	(0.010)	(0.027)	(0.015)	(0.022)
Whatever God gives	1.034***	1.154***	1.260***	1.428***	-0.072***	-0.324***	0.140***	0.257***
	(0.151)	(0.132)	(0.187)	(0.181)	(0.004)	(0.023)	(0.036)	(0.059)
Urban	-0.146***	-0.099***	0.184*	0.280*	-0.036*	-0.074*	0.093*	0.017*
	(0.030)	(0.029)	(0.108)	(0.149)	(0.018)	(0.040)	(0.048)	(0.010)
Two children x urban			-0.326***	-0.386**	0.059**	0.094***	-0.135**	-0.018***
			(0.111)	(0.152)	(0.027)	(0.033)	(0.054)	(0.006)
More than two x urban			-0.391***	-0.397**	0.068**	0.090***	-0.141**	-0.016***
			(0.124)	(0.157)	(0.033)	(0.028)	(0.057)	(0.005)
Whatever God gives x urban			-0.519	-0.643**	0.132*	0.116***	-0.228**	-0.020***
			(0.324)	(0.270)	(0.076)	(0.020)	(0.091)	(0.004)
Specification 2: literate								
Desired fertility (less than two ref.)								
Two children	0.319***	0.633***	0.814***	0.881***	-0.149***	-0.191***	0.300***	0.041***
	(0.057)	(0.075)	(0.127)	(0.146)	(0.031)	(0.023)	(0.047)	(0.006)
More than two	0.717***	1.012***	1.330***	1.304***	-0.122***	-0.324***	0.302***	0.144***
	(0.065)	(0.079)	(0.133)	(0.149)	(0.012)	(0.029)	(0.014)	(0.027)
Whatever God gives	1.031***	1.153***	1.580***	1.448***	-.0727***	-0.326***	0.134***	0.264***
	(0.151)	(0.132)	(0.216)	(0.203)	(0.004)	(0.025)	(0.042)	(0.067)
Literate			0.625***	0.340**	-0.047**	-0.087**	0.115**	0.019**
			(0.134)	(0.163)	(0.023)	(0.041)	(0.055)	(0.009)
Two children x literate			-0.722***	-0.395**	0.057**	0.100**	-0.135**	-0.021**
			(0.137)	(0.165)	(0.026)	(0.039)	(0.056)	(0.008)
More than two x literate			-0.985***	-0.491***	0.086**	0.107***	-0.174***	-0.019***
			(0.145)	(0.169)	(0.037)	(0.028)	(0.060)	(0.005)
Whatever God gives x literate			-0.853 ***	-0.514*	0.098	0.104***	-0.184*	-0.018***
			(0.311)	(0.267)	(0.067)	(0.033)	(0.095)	(0.005)
Control variables (see endnote 3)								
Age controls	√	√	√	√	√	√	√	√
Socio-economic controls	√	√	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√	√	√
Fertility controls	√	√	√	√	√	√	√	√

Notes: Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; fertility controls include marital duration, age at first birth, first child alive, first child daughter. Specification 1 and 2 from different OLS and ordered probit specifications for specific group. In cols. 1- 2 OLS and oprobit coeffs. of individual effects and cols. 3-4 interaction effects by using specific interaction terms of interest (spec.-1: residence, spec.-2: literate) including other same controls for each. And cols. 5-8 marginal effects of interaction terms. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

To examine the general assumption on variant effects of desired fertility on actual fertility across different socioeconomic groups, we estimate

interaction effects of desired fertility on actual fertility by socioeconomic characteristics like previous model of desired fertility. Table 5.5 (full result is not presented) presents the individual and interaction effects of desired fertility by residence and literacy.

In first specification of Table 5.5, interaction effects of desired fertility and residence implies that urban rural variation is significant in the effects of fertility desire on actual births. Urban woman is 23% less likely to have three to five children than others having whatever God gives preference. Literacy specification predicts that being literate woman effects of desired fertility on actual fertility is significant and negative; for instance, literate woman is 17% less likely to have three to five children than others if her desired fertility is more than two.

In further robustness check, we estimate using alternative independent variables, i.e. fertility preference and desire for more children and found similar patterns as for ideal number of children; then we estimate using alternative dependent variable number of surviving children on all competent explanatory variables of desired fertility and find the same trends as for actual births (partial results in Tables A5 & A6).

5.3   Women Empowerment and Desired and Actual Fertility

This section presents evidence for fifth hypotheses. From our qualitative data, there is a support for no real change in women's reproductive rights; and two regions differ greatly in the opinion. While women in Sylhet region think there is no change; women in Khulna think, though apparently there is no real change in women's reproductive rights, some changes, i.e. women can make decision on FP, couple can decide the number of children, and other relatives' pressure is not much significant now to be mentioned. Therefore, we intend to test the effects of women empowerment on fertility regime.

Table 5.6 presents results of desired fertility on women empowerment; and depicts that overall empowerment index is not significant determinants of desired fertility, but empowerment index on mobility is significant (at 5% level) and it reduces woman's desired fertility by 13 percentage points. But the RSKRs empowerment is not significant in assessing desires. Among the original dummies (col.-3) knowledge on AIDS and MR, not having forced sex, and health center can go alone reduce woman's fertility desires whereas knowledge on STDs increases. Ordered probit coefficients in column-4 indicate that if women empowered in mobility her probability of having higher fertility choices reduces by 24%. Moreover, whereas mobility empowerment reduces her chance by 6.5% to have more than two children as fertility desires, empowerment in decision making increase this probability by 3.2%.

Table 5.6
Women Empowerment and Desired Fertility

	OLS Coeff.	OLS Coeff.	OLS Coeff.	OPROBIT Coeff.	Marginal effects			
					Less than two	Two children	More than two	Whatever God gives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification 1:								
WE-index	-0.008			-0.007				
	(0.026)			(0 .047)				
Specification 2:								
WE-RSKRs		-0.049		-0.048	0.003	0.010	-0.013	-0.001
		(0.036)		(0.064)	(0.004)	(0.014)	(0.017)	(0.001)
WE-decision		0.063*		0.119*	-0.008	-0.025 *	0.032*	0.001
		(0.037)		(0.070)	(0.005)	(0.015)	(0.019)	(0.001)
WE-mobility		-0.132**		-0.241***	0.017**	0.051**	-0.065***	-0.003
		(0.051)		(0.090)	(0.007)	(0.021)	(0.025)	(0.002)
Specification 3:								
Knowledge on STDs			0.971***					
			(0.179)					
Knowledge on AIDS			-1.039***					
			(0.164)					
Knowledge on MR			-0.246**					
			(0.119)					
Don't have forced sex			-0.214**					
			(0.106)					
Don't Justify DV for denying sex			0.118					
			(0.140)					
Money spending decision			0.061					
			(0.109)					
Own health decision			0.073					
			(0.224)					
Daily purchase decision			-0.035					
			(0.100)					
Major purchase decision			-0.023					
			(0.265)					
Don't justify DV for arguing			-0.085					
			(0.111)					
Child health decision			0.096					
			(0.156)					
Visits decision			-0.081					
			(0.154)					
Health centre can go			-0.262***					
			(0.094)					
Don't justifies DV on mobility			-0.049					
			(0.102)					
Control variables (see endnote 1)								
Age controls	√	√	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√	√	√

Notes: Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles. Each specification (specs. 1-3) from different OLS and ordered probit specifications. In cols 1-3 OLS coeffs. for 3 specs. and in cols. 4-8 ordered probit coeffs. and marginal effects for spec.-2) including other same controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table 5.7 presents evidence of whether women's empowerment affects actual fertility; and results show that overall empowerment index is not significant; however, empowerment in RSKRs reduces actual births by 12.6%, whereas empowerment in decision making increases the actual births by 18.8% and these results are statistically significant. Results of original dummies show whereas knowledge on AIDS reduces actual births by around 93 percentage points; own health decision increase actual births by 103 points. In column-4, the ordered probit coefficients indicate that decision making empowerment increases women's chance of having more children whereas empowerment in mobility reduces this probability. Importantly, empowerment in RSKRs for actual births is not significant in ordered probit estimation. The marginal effects indicate that decision making empowerment increases the probability of having three to five children by 10.3 percentage points whereas mobility empowerment reduces this outcome by 9%. The magnitude and significant levels differ between two estimations, however direction is the same.

Table 5.7
Women Empowerment and Actual Fertility

	Dependent Variable: Total Children Ever Born							
	OLS Coeff.	OLS Coeff.	OLS Coeff.	oprobit (Coeff.)	Marginal effects			
					Less than two	Two children	Three to five	Six & more
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Specification 1:								
WE-index	0.062							
	(0.045)							
Specification 2:								
WE-RSKRs		-0.126**		-0.084	0.015	0.018	-0.031	-0.001
		(0.060)		(0.066)	(0.011)	(0.015)	(0.025)	(0.001)
WE-decision		0.188***		0.276***	-0.048***	-0.059***	0.103***	0.004**
		(0.065)		(0.078)	(0.015)	(0.020)	(0.030)	(0.002)
WE-mobility		-0.087		-0.248***	0.043**	0.053***	-0.092***	-0.004*
		(0.079)		(0.090)	(0.018)	(0.020)	(0.033)	(0.002)
Specification 3:								
Knowledge on STDs			0.522					
			(0.521)					
Knowledge on AIDS			-0.926*					
			(0.499)					
Knowledge on MR			0.245					
			(0.206)					
Don't have forced sex			-0.174					
			(0.161)					
Don't justify DV for denying sex			-0.045					
			(0.220)					
Money spending decision			0.019					
			(0.178)					
Own health decision			1.028***					
			(0.330)					
Daily purchase decision			0.362**					
			(0.179)					

Major purchase decision	-0.340							
	(0.415)							
Don't justify DV for arguing	0.092							
	(0.160)							
Child health decision	-0.379							
	(0.295)							
Visits decision	0.103							
	(0.253)							
Health centre can go	-0.209							
	(0.168)							
Don't justify DV on mobility	0.068							
	(0.177)							
Control variables (see endnote 3)								
Age controls	√	√	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√	√	√
Fertility controls	√	√	√	√	√	√	√	√

Notes: Age control includes age and age squared, socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; and fertility controls nclude marital duration, age at first birth, first child alive, first child daughter. Each specification (specs. 1-3) from different OLS and ordered probit specifications. In cols 1-3 OLS coeffs. for 3 specs. and in cols. 4-8 ordered probit coeffs. and marginal effects for specs. 2) including other same controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

From women empowerment specifications of desired and actual fertility we find that for desired and actual fertility empowerment in mobility is important whereas empowerment in decision making is important for actual births which is plausible regarding our assumption of social effect mechanisms. Moreover, our study supports Munshi and Myaux's (2006) view on necessity of women's mobility in changing reproductive behaviour; however, whether women alone can go health centre is not significant in predicting actual fertility; but it is significant in decreasing desired fertility.

5.4 Gap between Desired and Actual fertility

In our last effort, we aim to investigate the factors that contribute to the gap between desired and actual fertility. For this we use all potential determinants of desired and actual fertility in several estimations (Table A8). In analytical section, it was hypothesized that more access to media and social interactions lower the fertility desires; and in our previous sections we reported evidence for this.

We find that cluster ideal increases the gap between desired and actual fertility about 14%. Whereas woman who declares more than two children as desires the gap between her desired and actual fertility increases than who declares less than one child as preferences. Cluster level media and social interaction specification reveals that one unit increase in media access increases the gap by 60 percentage point, whereas FP messages exposure and FP discussion within community reduce the gap by 27 and 100 percentage point respectively. Individual level media and social interactions have little effects on

the gap. However, frequent discussion of FP with husband reduces the gap by 14.8 percentage point then who never discusses. Domiciliary service or visit by anyone has a negative effect on the gap. In women empowerment specification we find that empowerment in mobility reduces the gap by 12.9 percentage point.

Here, we find that social interactions, individual or social level, reduce the gap between desired and actual fertility, whereas increased media exposure and social norms increase the gap. In addition, women empowerment in mobility helps to reduce the gap.

Chapter 6   Conclusion

This research intended to investigate the determinants of fertility within the framework of TPB approach, and interdependent preference model by applying econometric analysis. We used BDHS 2007 dataset to provide a mechanism of social effects where social norm is identified as important determinant of individual's fertility desires; and effects of media and FP messages exposure, either through individual level or social networks, is significantly evidenced through social norms. Results showed that desired fertility of individual is closely connected with fertility ideals of the society; and fertility outcome of the individual is determined by her desired fertility.

Media and social interactions as instrumental to fertility represent the significance of information flows within individual's own social networks. We find a sequence of social effects mechanism from media and social interactions at individual level to the social level that shapes the fertility norms of the society. However, social norms of fertility is not sufficiently linked to individual level exposures, rather it is closely affected by the information within social networks as a whole which yields that through the interactions within social networks individual level messages conveyed and evaluated among members of the society be of assistance to social norms. We find that higher the access to information within social networks lower the fertility ideals of the society; reversely, higher the fertility ideal in society higher the individual's fertility ideal; subsequently, higher fertility desires results in higher number of actual births. Moreover, social interaction is important in reducing the gap between desired and actual fertility of individual.

From significant determining disposition of media and social interactions, in both OLS and ordered probit estimations, on desired fertility we concur with their complementary roles. In general, the expected role of mass media and social interactions jointly should be more effective on fertility decisions; and our OLS estimations predicts the significant interaction effects of media access and FP exposure in media on desired fertility if woman has FP information within her social settings, though ordered probit estimation provides different results, we can accept the joint role of mass media and social interactions in fertility decisions to some extent.

In fertility regime, variation among different socioeconomic groups is evidenced from different empirical research, and our descriptive statistics demonstrate these variations as well even if, in econometric models we find little effects of various socioeconomic groups on desired and actual fertility. In general, we would expect younger generation, educated, urban, rich woman are more likely exposed to FP messages through mass media and social networks; and we find significant interaction effects of mass media and social interactions on desired fertility regarding wealth, religious and regional variations. Significant interaction effects of social norms on desired fertility across age, literacy and wealth quintiles imply that there is a variant effect of social norms on desired fertility across socioeconomic groups. Though there is assumption that actual fertility of different groups varies because of variations in their

fertility choices, we tested this assumption by introducing interaction terms of desired fertility with socioeconomic characteristics; and found significant effects of desired fertility on actual fertility if woman is literate and urban; and can conclude that though there is a variation in the effect of desired fertility on actual fertility in respect to some socioeconomic characteristics, but the variation is not observable across all socioeconomic groups.

General belief in development discourse of fertility is that women empowerment in decision making, mobility, and reproductive and sexual health and rights reduce fertility outcomes by reducing fertility desires. We found that decision making empowerment increases desired and actual fertility whereas empowerment in mobility decreases both. However, our ordered probit result confirms the necessity of women's physical mobility (women's health centre visit) in changing reproductive behaviour as proposed by Munshi and Myaux (2006). But their conclusion on the reducing role of domiciliary services by the health worker cannot be confirmed by our findings.

A number of researches in population studies demonstrated the potential role of media and social interactions in fertility choices and outcomes. The influencing role of individual's fertility choices on behaviour is also well documented by the work of prominent population economists (e.g. Pritchett, Bongaarts). Our findings in this research correspond with the majority of the research carried out in this area. We acknowledge that media content is only one of many sources contributing to fertility desires, and the effects are coupled with other factors in social settings, i.e. social norms, social pressure. From this survey, we learn that the settings where higher fertility desires is the issue of population dynamic, intervention in popular fertility norm of the society is necessary; and along with media contents increased social interactions can intervene in social norms.

Notes

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[1] The relationship between these controls and fertility desires is significant in most cases, adding these controls account for effects on desired fertility due to changes in these characteristics. However, our caution is these estimates should not be considered as causal relationships, and we report that interpreting fertility desires conditional on endogenous socioeconomic controls is not straightforward. Despite these cautions, the inclusion of these controls has little effect on our estimated coefficients of social norms on individual's fertility desires (this note is applicable for all the tables presenting desired fertility estimations).

[2] To address the problem of heteroscedasticity that often encountered in cross-sectional data, we test Breusch_Pagan test, and the result shows (not included) the presence of heteroscedasticity and the error term is not constant, so, we added the robust standard error to get the accurate statistics for all OLS and ordered probit

estimations in all tables in main text and appendix (this note is applicable for all regression analysis tables).

[3] The relationship between these controls and actual fertility is significant in most cases, adding these controls account for effects on actual fertility due to changes in these characteristics. However, our caution is these estimates should not be considered as causal relationships, and we report that interpreting fertility behaviour conditional on endogenous socioeconomic controls is not straightforward. Despite these cautions, the inclusion of these controls has little effect on our estimated coefficients of desired fertility on individual's fertility behaviour desires (this note is applicable for all the tables presenting actual fertility estimations).

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Appendices

Appendix A: Result Tables and Figures

Figure A1
Ideal Number of Children
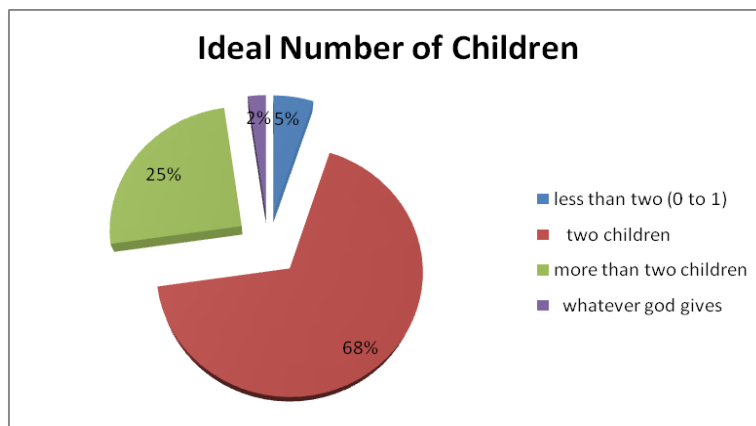
Figure A2
Surviving Children
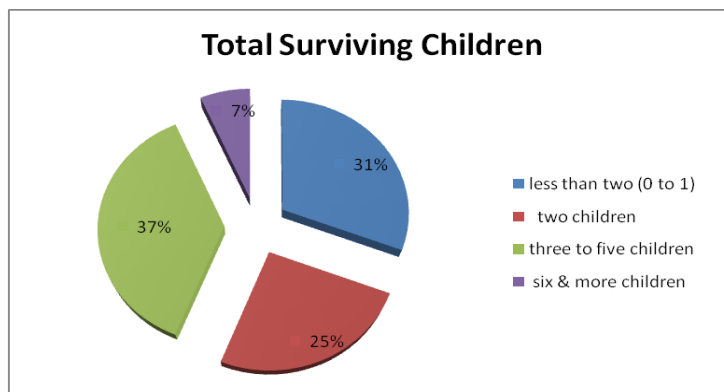
Figure A3
FP Exposure through Media
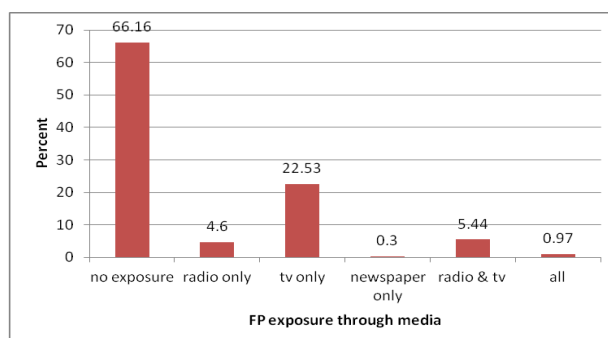
Table A1
Media Exposure and Social Interactions on Desired Fertility

	Dependent Variable: Ideal number of Children						
	Interaction Effects		Individual Effects				
	(1)OLS	(2)oprobit (coeff.)	(3)oprobit (coeff.)	Marginal effects			
				Less than two	Two	More than two	Whatever God gives
Mediaaccess	-0.121***	-0.207***	-0.199***	0.014***	0.050***	-0.058***	-0.006***
	(0.025)	(0.039)	(0.035)	(0.002)	(0.009)	(0.010)	(0.001)
FP in media	-0.026	-0.059	-0.065**	0.005**	0.016**	-.0186**	-0.002**
	(0.020)	(0.038)	(0.033)	(0.002)	(0.008)	(0.009)	(0.001)
Anyone visit for FP	-0.051	-0.060	-0.043	0.003	0.010	-0.012	-0.001
	(0.035)	(0.054)	(0.031)	(0.002)	(0.007)	(0.009)	(0.001)
FP in poster/billboard	-0.128**	-0.179	-0.123***	0.010**	0.028***	-0.034***	-0.003***
	(0.059)	(0.112)	(0.044)	(0.004)	(0.009)	(0.012)	(0.001)
FP discussion in community	0.147	0.297	-0.015	0.001	0.004	-0.004	-0.0004
	(0.142)	(0.239)	(0.088)	(0.007)	(0.021)	(0.025)	(0.002)
Media access x visit by anyone	0.036	0.003					
	(0.047)	(0.078)					
Media access x FP in poster	0.124*	0.141					
	(0.071)	(0.132)					
Media access x FP discussion in community	0.029	-0.079					
	(0.192)	(0.315)					
FP in media x visit by anyone	0.016	0.036					
	(0.040)	(0.074)					
FP in media x FP in poster	-0.035	-0.088					
	(0.058)	(0.112)					
FP in media x FP discussion in community	-0.265*	-0.334					
	(0.147)	(0.242)					
Control variables (see endnote 1)							
Age controls	√	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√	√

Notes: Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use. Columns 1 and 2 OLS and oprobit coeffs by using including interaction terms. Cols 3-7 oprobit coeffs. and marginal effects of original variables only. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table A2
Interaction Effects of Media and FP Exposure across Socioeconomic Groups on Desired Fertility

	Dependent Variable: Ideal Number of Children					
			Marginal Effects			
	OLS	oprobit (coeff.)	Less than two	Two children	More than two	Whatever God gives
	(1)	(2)	(3)	(4)	(5)	(6)
specification 1: by age						
Media	-0.064**	-0.220***	0.015***	0.056***	-0.064***	-0.007***
	(0.026)	(0.049)	(0.003)	(0.013)	(0.014)	(0.002)
FP media	-0.034	-0.076*	0.006*	0.018*	-0.022*	-0.002*
	(0.021)	(0.044)	(0.003)	(0.010)	(0.012)	(0.001)
Age	0.144***	0.074	-0.005	-0.018	0.021	0.002
	(0.038)	(0.057)	(0.004)	(0.014)	(0.016)	(0.002)
Media x age	-0.078**	0.035	-0.003	-0.009	0.010	0.001
	(0.040)	(0.064)	(0.005)	(0.016)	(0.019)	(0.002)
FP media x age	0.008	0.025	-0.002	-0.006	0.007	0.001
	(0.034)	(0.062)	(0.004)	(0.016)	(0.018)	(0.002)
Specification 2: literacy						
Media	-0.089***	-0.154***	0.011***	0.039***	-0.045***	-0.005***
	(0.031)	(0.047)	(0.003)	(0.012)	(0.014)	(0.002)
FP media	-0.071**	-0.109**	0.008*	0.026**	-0.031**	-0.003**
	(0.032)	(0.054)	(0.004)	(0.013)	(0.015)	(0.002)
Literate	-0.047	-0.033	0.002	0.008	-0.009	-0.001
	(0.032)	(0.046)	(0.003)	(0.011)	(0.013)	(0.001)
Media x literate	-0.028	-0.094	0.007	0.023	-0.027	-0.003
	(0.041)	(0.065)	(0.005)	(0.016)	(0.019)	(0.002)
FP media x literate	0.060	0.065	-0.005	-0.016	0.019	0.002
	(0.038)	(0.067)	(0.005)	(0.017)	(0.020)	(0.002)
Specification 3: religion						
Media	0.034	0.177	-0.013	-0.041	0.050	0.005
	(0.244)	(0.325)	(0.026)	(0.073)	(0.091)	(0.008)
FP media	-0.397	-0.863	0.080	0.169**	-0.227*	-0.022
	(0.300)	(0.564)	(0.067)	(0.080)	(0.132)	(0.015)
Muslim	-0.188	-0.178	0.011	0.048	-0.053	-0.006
	(0.186)	(0.266)	(0.015)	(0.077)	(0.081)	(0.010)
Hindu	-0.479**	-0.645**	0.075	0.089***	-0.154***	-0.010***
	(0.191)	(0.276)	(0.046)	(0.008)	(0.051)	(0.003)
Media x Muslim	-0.141	-0.372	0.026	0.093	-0.108	-0.011
	(0.245)	(0.327)	(0.022)	(0.084)	(0.095)	(0.011)
Media x Hindu	-0.131	-0.450	0.047	0.075***	-0.113	-0.008**
	(0.250)	(0.341)	(0.048)	(0.029)	(0.072)	(0.004)
FP media x Muslim	0.359	0.785	-0.048	-0.216	0.231	0.032
	(0.300)	(0.565)	(0.031)	(0.165)	(0.163)	(0.033)
FP media x Hindu	0.456	0.961*	-0.032***	-0.327	0.286**	0.074
	(0.302)	(0.572)*	(0.007)	(0.213)	(0.136)	(0.085)
Specification 4: residence						
Media	-0.109***	-0.164***	0.011***	0.041***	-0.048***	-0.005***
	(0.025)	(0.039)	(0.003)	(0.010)	(0.012)	(0.001)
FP media	-0.050**	-0.096**	0.007**	0.023**	-0.027**	-0.003**
	(0.023)	(0.042)	(0.003)	(0.010)	(0.012)	(0.001)
Urban	-0.124***	-0.074	0.005	0.018	-0.021	-0.002
	(0.035)	(0.056)	(0.004)	(0.013)	(0.016)	(0.002)
Media x urban	0.033	-0.115	0.009	0.027	-0.033	-0.003
	(0.043)	(0.074)	(0.006)	(0.017)	(0.021)	(0.002)
FP media x urban	0.045	0.071	-0.005	-0.018	0.021	0.002
	(0.034)	(0.064)	(0.004)	(0.016)	(0.019)	(0.002)

Specification 5: region

Media	-0.104***	-0.225***	0.016***	0.057***	-0.066***	-0.007***
	(0.024)	(0.040)	(0.003)	(0.011)	(0.012)	(0.002)
FP media	-0.037*	-0.047	0.004	0.011	-0.013	-0.001
	(0.020)	(0.037)	(0.003)	(0.009)	(0.011)	(0.001)
Khulna	-0.199***	-0.351***	0.033***	0.069***	-0.094***	-0.008***
	(0.036)	(0.063)	(0.007)	(0.010)	(0.015)	(0.001)
Sylhet	0.449***	0.501***	-0.027***	-0.149***	0.153***	0.023***
	(0.058)	(0.059)	(0.003)	(0.020)	(0.019)	(0.004)
Media x Khulna	0.087*	0.196**	-0.013**	-0.052**	0.058**	0.007*
	(0.047)	(0.090)	(0.005)	(0.026)	(0.028)	(0.004)
Media x Sylhet	-0.240***	-0.175*	0.015	0.038**	-0.048*	-0.004**
	(0.081)	(0.098)	(0.010)	(0.018)	(0.026)	(0.002)
FP media x Khulna	-0.012	-0.155*	0.013	0.034**	-0.043*	-0.004**
	(0.039)	(0.085)	(0.008)	(0.016)	(0.023)	(0.002)
FP media x Sylhet	0.043	-0.014	0.001	0.003	-0.004	-0.0004
	(0.076)	(0.103)	(0.008)	(0.025)	(0.030)	(0.003)
Specification 6: wealth						
Media	-0.157***	-0.292***	0.020***	0.075***	-0.085***	-0.009***
	(0.046)	(0.066)	(0.004)	(0.018)	(0.019)	(0.002)
FP media	-0.002	-0.059	0.004	0.014	-0.017	-0.002
	(0.023)	(0.044)	(0.003)	(0.010)	(0.012)	(0.001)
Poor	0.067*	0.068	-0.005	-0.017	0.020	0.002
	(0.035)	(0.052)	(0.004)	(0.013)	(0.015)	(0.002)
Rich	0.050	0.112	-0.008	-0.028	0.032	0.003
	(0.052)	(0.071)	(0.005)	(0.018)	(0.021)	(0.002)
Media x poor	0.023	0.037	-0.003	-0.009	0.011	0.001
	(0.056)	(0.083)	(0.006)	(0.021)	(0.024)	(0.002)
Media x rich	0.173***	0.263***	-0.016***	-0.073**	0.079***	0.009**
	(0.061)	(0.092)	(0.005)	(0.028)	(0.029)	(0.004)
FP media x poor	-0.009	0.106	-0.007	-0.028	0.031	0.003
	(0.042)	(0.077)	(0.005)	(0.021)	(0.023)	(0.003)
FP media x rich	-0.128***	-0.141*	0.011	0.031*	-0.039*	-0.003**
	(0.046)	(0.082)	(0.007)	(0.016)	(0.022)	(0.002)
Control variables						
Age	√	√	√	√	√	√
Socio-economic controls	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√

Notes: Robust standard errors in parentheses. Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use. Each specification (specs. 1-6) from different OLS and ordered probit specifications for specific group. In columns 1 and 2 OLS and oprobit coeffs. and columns 3-6 marginal effects by using specific interaction terms of interest (spec. 1 interest characteristics: age, spec. 2-literacy, 3- religion, 4- residence, 5- region and 6- wealth with media and FP in media exposure) including other same controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table A3
Social Norms, Media Exposure and Social Interactions on Desired Fertility
(robustness checks)

			Dependent Variable: Fertility Preference			
			Marginal effects			
	OLS	oprobit (coeff.)	Have another	Undecided	Declared infecund	No more
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Specification 1:						
Cluster ideal	-0.228***	-0.267***	0.088***	0.003***	0.006***	-0.096***
	(0.069)	(0.094)	(0.031)	(0.001)	(0.002)	(0.034)
Specification 2:						
Predicted cluster ideal	-0.0001	0.011	-0.004	-0.0001	-0.0003	0.004
	(0.110)	(0.154)	(0.051)	(0.002)	(0.004)	(0.056)
Specification 3:						
Media access within cluster	0.072	0.136	-0.045	-0.001	-0.003	0.049
	(0.093)	(0.129)	(0.042)	(0.001)	(0.003)	(0.047)
FP in media within cluster	0.039	-0.013	0.004	0.0001	0.0003	-0.005
	(0.118)	(0.161)	(0.053)	(0.002)	(0.004)	(0.058)
FP in poster within cluster	-0.203	-0.228	0.075	0.002	0.005	-0.082
	(0.145)	(0.196)	(0.064)	(0.002)	(0.005)	(0.071)
Anyone visit for FP within cluster	-0.156**	-0.205*	0.067*	0.002*	0.005*	-0.074*
	(0.079)	(0.108)	(0.035)	(0.001)	(0.003)	(0.039)
FP discussion in community	0.983***	1.305***	-0.428***	-0.012***	-0.031***	0.471***
	(0.344)	(0.472)	(0.155)	(0.005)	(0.011)	(0.170)
Share of Muslim in cluster	0.387	0.523	-0.172	-0.005	-0.012	0.189
	(0.357)	(0.445)	(0.146)	(0.004)	(0.010)	(0.160)
Share of Hindu in cluster	0.378	0.478	-0.157	-0.005	-0.011	0.173
	(0.363)	(0.454)	(0.149)	(0.004)	(0.011)	(0.164)
Specification 4:						
Media access	-0.021	-0.030				
	(0.030)	(0.042)				
FP in media	-0.048	-0.060				
	(0.029)	(0.039)				
Anyone visit for FP	-0.006	0.007				
	(0.029)	(0.040)				
FP on poster	0.066	0.079				
	(0.043)	(0.055)				
FP discussion in community	0.079	0.118				
	(0.082)	(0.109)				
FP talks with husband (never ref.)						
Once or twice	0.049*	0.108***				
	(0.026)	(0.036)				
More often	0.026	0.070				
	(0.042)	(0.054)				
Control variables (see endnote 1)						
Age	√	√	√	√	√	√
Socio-economic controls	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√

Notes: Robust standard errors in parentheses. Age control includes age and age squared, socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include

Table A4
Determinants of Actual Fertility (robustness checks)

	Dependent Variable: Total Children Ever Born							
	(1)		(2)		(3)		(4)	
	OLS Coeff.	S.E.	OLS Coeff.	S.E.	OLS Coeff.	S.E.	OLS Coeff.	S.E.
Specification 1:								
Desired fertility (less than one ref.)								
Two children	0.323***	0.057	0.282***	0.057	0.310***	0.056	0.267***	0.058
More than two children	0.719***	0.065	0.588***	0.066	0.678***	0.065	0.627***	0.066
Whatever God gives	1.034***	0.151	0.916***	0.150	0.959***	0.149	1.058***	0.146
Specification 2:								
Cluster ideal			0.690***	0.069				
Specification 3:								
Media access within cluster					-0.851***	0.111		
FP in media within cluster					0.107	0.137		
FP in poster within cluster					0.105	0.166		
Anyone visit for FP within cluster					-0.267***	0.090		
FP discussion in community					0.689**	0.423		
Share of Muslim in cluster					0.262	0.454		
Share of Hindu in cluster					0.232	0.462		
Specification 4:								
FP talks with husband (never ref.)								
Once or twice							0.134***	0.029
More often							0.130***	0.039
Media access							-0.190***	0.037
FP in media							-0.025	0.032
Anyone visit for FP							0.051*	0.030
FP on poster							-0.066*	0.039
FP discussion in community							-0.012	0.080
Control variables (see endnote 3)								
Age controls	√		√		√		√	
Socioeconomic controls	√		√		√		√	
Contraceptive controls	√		√		√		√	
Fertility controls	√		√		√		√	

Notes: Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; fertility controls include marital duration, age at first birth, first child alive, first child daughter. Cols. 1-4 from different OLS specifications by including different interest variables ((col 1- desired fertility, col 2- including cluster ideal, col 3 media and FP exposure within cluster and col 4- individual level media & FP exposure) with main interest variable desired fertility including the same other controls for each. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Standard errors (S.E.) are robust. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table A5
Desired Fertility and Actual Fertility (robustness checks)

	Dependent Variable: Total Children ever Born					
	OLS	oprobit (coeff.)	Marginal effects			
			Less than two	Two	Three to five	Six & more
	(1)	(2)	(3)	(4)	(5)	(6)
Preferred fertility (Have another ref.)						
Undecided	0.296***	0.527***	-0.036***	-0.159***	0.157***	0.038***
	(0.106)	(0.131)	(0.006)	(0.038)	(0.029)	(0.015)
Declared infecund	0.568***	0.889***	-0.047***	-0.256***	0.215***	0.088***
	(0.120)	(0.107)	(0.003)	(0.026)	(0.010)	(0.019)
No more	0.497***	0.893***	-0.127***	-0.217***	0.315***	0.029***
	(0.031)	(0.040)	(0.009)	(0.009)	(0.013)	(0.002)
Control variables (see endnote 3)						
Age controls	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√
Fertility controls	√	√	√	√	√	√

Notes: Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; fertility controls include marital duration, age at first birth, first child alive, first child daughter. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table A6
Desired Fertility and Actual Fertility (robustness check)

	Dependent Variable: Total Surviving Children					
	OLS	(2) oprobit (coeff.)	Marginal effects			
			Less than two	Two	Three to five	Six & more
	(1)	(2)	(3)	(4)	(5)	(6)
Desired fertility (less than two ref.)						
Two children	0.336***	0.641***	-0.141***	-0.102***	0.230***	0.014***
	(0.048)	(0.075)	(0.019)	(0.009)	(0.025)	(0.002)
More than two	0.655***	1.017***	-0.150***	-0.238***	0.337***	0.051***
	(0.055)	(0.079)	(0.010)	(0.019)	(0.021)	(0.008)
Whatever God gives	0.990***	1.245***	-0.113***	-0.315***	0.308***	0.120***
	(0.132)	(0.131)	(0.005)	(0.027)	(0.007)	(0.027)
Control variables (see endnote 3)						
Age controls	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√
Fertility controls	√	√	√	√	√	√

Notes: Robust standard errors in parentheses. Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include knowledge & use; fertility controls include marital duration, age at first birth, first child alive, first child daughter. We tested whether all of our adjacent thresholds are distinguishable, and found they are statistically different.*** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Table A7
Determinants of Gap between Desired and Actual Fertility

	Dependent Variable: Gap between desired and actual Fertility					
	(1)	(2)	(3)	(4)	(5)	(6)
Specification1:						
Cluster ideal	0.144*					
	(0.077)					
Specification 2:						
Predicted cluster ideal		-0.613***				
		(0.144)				
Specification 3:						
Desired fertility (less than one ref.)						
Two children			0.691***			
			(0.057)			
More than two children			1.682***			
			(0.066)			
Specification 4:						
Media access within cluster				0.601***		
				(0.118)		
FP in media within cluster				-0.294**		
				(0.144)		
FP in poster within cluster				-0.052		
				(0.175)		
Anyone visit for FP within cluster				0.200**		
				(0.094)		
FP discussion in community				-0.850*		
				(0.454)		
Share of Muslim in cluster				-0.182***		
				(0.068)		
Specification 5:						
FP talks with husband (never ref.)						
Once or twice					-0.133***	
					(0.031)	
More often					-0.148***	
					(0.043)	
Media access					0.090**	
					(0.041)	
FP exposure in media					0.012	
					(0.034)	
Anyone visit for FP					-0.058*	
					(0.032)	
FP on poster					0.032	
					(0.043)	
FP discussion in community					0.004	
					(0.090)	
Specification 6:						
WE-RSKRs						0.067
						(0.068)
WE-decision						-0.129*
						(0.077)
WE-mobility						-0.040
						(0.091)

Control variables (see endnote 3)						
Age	√	√	√	√	√	√
Socioeconomic controls	√	√	√	√	√	√
Contraceptive controls	√	√	√	√	√	√
Fertility controls	√	√	√	√	√	√

Notes: Robust standard errors in parentheses. Age control includes age and age squared; socioeconomic controls include employment, education, husband's education, religion, region, place of residence, wealth quintiles; contraceptive controls include Knowledge & use; and fertility controls include marital duration, age at first birth, first child alive, first child daughter. Columns 1-4 results of different OLS estimations (column 1- explanatory variable: only desired fertility, column 2- including cluster level share FP exposure, column 3- including share ideal & column 4- individual level media & FP exposure). *** p<0.01, ** p<0.05, * p<0.1. Source: own estimation.

Appendix B   Tools of Data Collection and Analysis

Tool B1   Focus Group Discussion Question Guidelines

- what do you think about having two or more children?
- evaluate government's two child policy.
- -what do you think talking about contraception with each other?
- for your case from where you have learned it?
- from where you can get information on contraception easily?
- can you remember any FP messages, pictures, TV/radio play, advertisements, songs that strike you?
- what causes led people to have fewer children?
- do you think there is a change in women's reproductive and sexual rights? How?

Tool B2   Case Study Checklist

- respondent's socioeconomic information (age, education, occupation, earnings, possessions).
- respondent's demographic/fertility information (marital age, age of first children, number of children, willing to have more, contraception use).
- respondent's husband's information.
- socio-economic and demographic information of respondent's mother and siblings.
- demographic history of five significant referent members in respondent's life.
- demographic history of the ideal person of the respondent.
- how the significant others are evaluating respondent's fertility behavior/intention.
- why respondent is (not) willing to have more kids.
- how respondent is managing child care.

Tool B3   Women Empowerment Index Construction

Empowerment index categories	Index components	Index value
Decision index		
	Decisions on spending money	Empowered (Alone) =1, Not empowered (With husband & other person, Husband alone & Someone else) =0
	Decision on hh daily purchase	Empowered (Alone)=1, not empowered (With husband & other person, Husband alone & Someone else) =0
	Decision on hh major purchase	Empowered (Alone)=1, not empowered (With husband & other person, Husband alone & Someone else) =0
	Decision on child health care	Empowered (Alone) =1, not empowered (With husband & other person, Husband alone & Someone else) =0
	Decision on own health care	Empowered (Alone) =1, not empowered (With husband & other person, Husband alone & Someone else) =0
	Justified DV for argument	Empowered (don't justifies)=1, not empowered (yes & don't know) =0
Mobility index		
	Health center can go alone	Empowered (Alone) =1, not empowered (With husband & children, With other person & No) =0
	Decision to visits family or relatives	Empowered (Alone)=1, not empowered (With husband & other person, Husband alone & Someone else) =0
	DV justifies if go outside without telling	Empowered (don't justifies)=1, not empowered (yes & don't know) =0
RSKRs index		
	Knowledge on STDs	Empowered (know)=1, not empowered (no) =0
	Knowledge on AIDS	Empowered (Know)=1, not empowered (no) = 0
	Knowledge on MR	Empowered (Know)=1, not empowered (no)=0
	Ever had forced sex	Empowered (No)=1, not empowered (sometimes & Yes)=0
	DV justifies if deny sex with husband	Empowered (don't justifies)=1, not empowered (yes & don't know)=0